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The Massachusetts Medical Society.

MEETING OF THE SECTION OF TUBERCULOSIS, JUNE 3, 1919.

DIET IN TUBERCULOSIS.

By I. J. CLARKE, M.D., HAVERHILL, MASS.

The contents of this paper will consist largely of more or less fixed deductions from the observation of a moderate number of cases of tuberculosis. There is no other disease which so taxes the resources of the dietitian. Many elements enter into the problems of successfully feeding the consumptive.

We have several conditions that cause the loss of appetite which makes feeding all the more difficult. Among these influences may be mentioned the moderate or highly toxic patients, those who cannot avail themselves of exercise or light work as a natural stimulus for an appetite. There is the victim of more or less constant functional indigestion so characteristic of certain cases. There is also a psychical phase which prevents eating and prevails more largely in institutions. We have various complications, particularly of the intestinal type, that interfere with eating. Many patients cough so much they have not the courage or strength to eat enough. In our sanatoria the foreign born

hold a strong aversion to the American dietary. Constipation plays its part. The overindulgence in sweets, nuts, and fruit works to a decided advantage. Too hearty mid-morning and afternoon lunches frequently interfere with the limits of digestion, therefore affecting what would be a more normal appetite. It has seemed wise to me to lessen the amount of food for supper to those patients who are carrying a high temperature, as it is natural to presume that their powers of digestion would be less at this time of day. We must all realize at the start that the one, and perhaps the most important, factor in feeding the consumptive is that all food should be of first quality; there should be no substitution in the line of fats. In the preparation of foods the utmost care should be taken that it is all cooked and served in a proper manner. A good sized book could be written upon this latter subject to the very great advantage of our best cooks. Too much of all food is cooked by rule, too little by reason. Even a hungry patient will refuse to eat a poorly prepared meal. It is my belief that institutions should have sufficient money to employ a higher grade of cooks and others having to do with the providing of food. Patients would eat much that is now wasted and the expense would be no greater. Every effort should be made to serve food warm, especially in the winter. A

reasonable variety is essential. Fixed menus for certain days should be avoided as much as possible. The foregoing is preliminary to the old adage that you can lead a horse to water but you cannot make him drink. In other words every effort should be made to place our patients under the most favorable physical and mental conditions and our strongest endeavor to place before them that which is the most palatable and nourishing. Most authorities agree that the diet should be fairly well balanced with a relatively large increase of protein and considerable increase of fat.

Dr. G. Carroll Smith in "What to Eat and Why," states that this rule should be carried out; also that people who eat animal protein are less liable to tuberculosis than vegetarians. He further expresses the opinion that the chief reason for increasing the protein is its importance in building up the cell protoplasm of the body and thus improving metabolism and hence digestion, which is often very much impaired by this disease. The same author advises increased amounts of vegetable protein in the form of peas, beans, etc., to the extent of two hundred grams daily. He further states that fats can better be utilized than carbohydrates to furnish heat and energy and make up the major part of the excess of calories required; that they can be given in a more concentrated form; that they are less bulky than carbohydrates; also that they cause less indigestion; and, further, they are better liked by patients. Dr. Smith recommends taking the average diet for the individual in health and so varying it by the addition of protein, carbohydrates, and fats, that he will have a diet which has a caloric value of about ten or fifteen calories per kilo weight of the body every twenty-four hours in excess of his normal diet. In this way a patient weighing one hundred and fifty pounds with tuberculosis is receiving at least seven hundred and fifty calories more per day than is his average diet in health,—the excess to be varied according to the patient's loss or gain in weight. It is also his opinion that the weight should not be increased much over five or ten pounds the normal weight in normal health, and that of obese patients should not be increased.

Klebs says, "In no other disease is abundant feeding so essential. It must be carried out not only through the abundance of food furnished

but by its quality, by its method of preparation, and by its variety. While it is possible to overburden the digestive tract, this danger is insignificant compared with the likelihood of not giving enough food to make good his waste and to fortify him against the ravages of the disease. That diet is best which taxes the alimentary powers least and furnishes the greatest amount of nourishment. He also states that the demand for an excess of fat is in no disease more pronounced. His experience of two decades has brought him to this attitude in prognosis. If, after two or three months, the patient can take the amount of food that he requires and gain weight on it, his prognosis is influenced favorably. He has rarely found the tuberculosis process to be advancing when the patient has been steadily gaining weight for any length of time. He believes that proper nourishment is of the first importance, for patients do well even under adverse climatic and other conditions, but they cannot improve without food and an abundance of it. He also states that the most reliable guide of the patient's improvement is his gain in weight; he should be weighed each week at the same time of day and under the same physical conditions and his food consumption should be regulated by the results."

Most authorities agree that a tuberculous patient ought to have from 3000 to 4500 calories of food elements daily. Many of the markedly advanced types cannot take care of more than 2000. It is my opinion that enough attention has never been given to diet in either acute or chronic disease. We know that the obese eat the wrong food or too much and that the diet of the thin person is generally faulty. They both need regulating. I have often thought that if the taste and desires of the tuberculous patient could be carefully considered and studied from his own standpoint and something of a compromise made from the caloric regulation that he would consume much more food with an equal benefit to himself and incidentally more pleasure. The sick, discouraged, idle consumptive needs all the pleasant anticipation and realization that is possible.

Gautier says, "It has been repeatedly written and said, every tuberculous patient who eats well and gains in weight is curable. This is unhappily not quite an exact statement, but it may be said that among these invalids resistance

is proportional to appetite and to the digestive powers. Those only live long who feed well."

It is not the intention of the writer to go into much detail as regards diet lists but to generalize upon the most desirable articles of food and to comment upon their administration.

Under the head of protein, milk comes first as the most commonly used and the easiest to digest. It is my belief that it should be used as the main food by all very sick persons; that it should take the place of tea very largely. It can be served hot with a bit of salt and well sweetened to be drunk at the end of the meal. Everyone ought to be advised to avoid taking fluids of any kind while masticating their food. Here let me say that the teeth of all patients who have any chance of recovery should have the utmost care. Milk should be given mid-morning and afternoon if the patient eats well at mealtime. If the patient is on a liquid diet an egg can be added at these times. Milk should be kept absolutely sweet and well strained. It can at times be used sour or modified with the *Bacillus Bulgaricus*. Scalding it seems at times to improve a diarrhea. Milk in various other forms may be occasionally used for the individual patient. At least one quart of milk should be taken daily. A little dilution at times favors its digestion.

Eggs in nutritive value and ease of assimilation occupy a position second only to milk. They can be served in a variety of ways with the exception of frying. In feeding those who cannot take solids I often give the double egg nog, which consists of a third of a tumbler of milk, two eggs, salt to taste, one or two teaspoons of sugar, and flavored with vanilla, nutmeg, or chocolate. By this method a patient with pneumonia took twenty-four eggs daily for five days without any trouble. Eggs in the form of steamed custards flavored with chocolate are very palatable. Eggs served as a principal diet or taken raw should always be strictly fresh.

Meat comes third in the dietary of the tuberculous patient. Beef contains the highest per cent. of protein, pork the highest of fat. Corned beef has the highest per cent. of protein of any kind of meat, medium fat bacon the highest per cent. of fat. Lamb and poultry follow next in their protein contents. Skimmed milk cheese yields a higher protein percent than beef. Dried peas and lentils yield a large percent,

also baked beans, and in a lesser proportion, shelled beans. Gelatin shows the highest per cent. of protein of any article of food.

The foods yielding up the highest per cent. of carbohydrates are as follows: arrowroot, 97½; tapioca, 88; corn and rice, about 80; honey, 81; sago, 78; wheat flour, 65, toasted bread, 61; flour in the form of cracker and zwieback show from 70 to 75 per cent.; dried peas and lentils about 60; potatoes, 20; in the form of chips, 39; bananas, 20. Some fruits show high carbohydrates contents, namely dates, 78; raisins, 76; figs, 74; currants, 74; apples, 66, apricots, 62; this comes largely from the sugar they contain. We must never lose sight of the fact that sugar has the next highest caloric content to the high class fat; that it can be added to many articles of food with much benefit to the patient as its taste results in more food being taken.

The highest percentage of fat is obtained from unrefined lard, 94%. Next comes butter, 85%. Then bacon, medium fat, 67%. Smoked bacon, 64%. Pork, 44%. Lean bacon, 42%. Red American cheese, 38%. Potato chips, 39%. Brazil nuts, filberts, and California walnuts yield respectively, 66, 65, and 64%. For fish, salmon and turbot have the highest per cent. of fat.

It is a comparatively easy matter to arrange the diet for the seriously ill as it generally consists of liquids. There is, however, besides those that have a good appetite and digestion, a relatively large per cent. of patients who have a poor or indifferent appetite. It is for this class that we are at present most concerned. We must, of course, consider carefully the limits of a patient's digestion, but taking the average of the type we are now discussing, it seems to me that we should give more attention to the palatability of the food and if necessary disregard its caloric value. There is a satisfaction and encouragement to the patient in having eaten something. The food that a person relishes is said to digest more easily.

It is quite impossible to force nourishment for months and years as is done for the acutely sick during a few days. The secret of the problem is to make eating the most attractive feature of the cure.

With your permission I will read you a week's menu of the Haverhill Sanatorium as an illustration:

Breakfast—Cereal, beans and fishcakes, rolls, milk, tea, and coffee.

Dinner—Roast chicken, potatoes, summer squash, lemon ice cream.

Supper—Cold meat, sliced tomatoes, rolls, cake, stewed prunes, milk, tea.

Breakfast—Boiled eggs, cereal, corn bread, boiled sweet and white potatoes, coffee, milk.

Dinner, Broiled steak, potatoes, sliced tomatoes, cracker pudding with cream, milk, tea.

Supper—Cold meat, hot biscuit, preserved pears, milk, tea, coffee.

Breakfast—Cereal, scrambled eggs, baked potatoes, hot gems, milk, coffee, tea.

Dinner—Boiled cod with egg sauce, potatoes, cabbage, apple pie, milk, tea.

Supper—Cold meat, fried potatoes, cake, apple sauce, milk, tea.

Breakfast—Cereal, scrambled eggs, muffins, milk, coffee.

Dinner—Roast beef, potatoes, tomato soup, turnip, frozen jelly, milk and tea.

Supper—Fish chowder, fried potatoes, cold meat, milk, tea.

Breakfast—Corn meal mush, fried eggs, bacon, corn cake, coffee, milk, tea.

Dinner—Irish stew, sweet potatoes, Washington pie, milk, tea.

Supper—Cold ham, fried potatoes, bread, chocolate cake, milk, tea.

Breakfast—Boiled eggs, plain potatoes, cereal, hot biscuit, coffee, tea, milk.

Dinner—Boiled haddock, creamed sauce, boiled potatoes, boiled onions, rice pudding, milk and tea.

Supper—Clam chowder, fried potatoes, cake, preserved pears, milk, tea.

Breakfast—Oatmeal cereal, griddle cakes, maple syrup, coffee, milk, tea.

Dinner—Boiled dinner, rice pudding, milk, tea.

Supper—Baked beans, brown bread, stewed prunes, milk, cocoa, tea.

Breakfast—Cereal, baked beans, fish cakes, milk, coffee, tea.

Dinner—Roast chicken, giblet sauce, stewed tomatoes, summer squash, boiled onions, mashed potatoes, vanilla ice cream, milk and tea.

Bread is served with all meals.

DIET IN TUBERCULOSIS.

By ROY MORGAN, M.D., WESTFIELD, MASS.,

Assistant Superintendent, Westfield State Sanatorium.

HAPPILY the time of forced feeding in tuberculosis has passed. But it seems to us that there is still a tendency to over feeding.

At the Westfield State Sanatorium we have for a long time felt that lunches should be abolished as a routine and that adult patients should have only the three meals per day. We long ago abandoned the custom of giving raw eggs between meals and for the past year have served no milk for lunches. We based this belief on the following considerations:

In the first place, the stomach as well as other organs needs rest, and it does not get the proper rest if food is put into it oftener than three times a day. Under these conditions the digestive organs fail to utilize the surplus, which is really wasted. It may be worse than wasted, for the overloading may lead to digestive disturbances.

Again, the idea of over-feeding is fundamentally wrong. We have a patient who is under weight. Therefore, he should eat more in order to regain what he has lost. This seems at first thought to be good logic, but it is very fallacious. If I have a leaky pail it would be just as logical to keep replacing the lost water rather than to mend the leak. So in tuberculosis it seems to us more logical to treat loss of weight by removing, if possible, the toxemia which causes the loss. If we can remove the cause the patient should gain in weight, for we have stopped the leak from the body and it is not necessary to supply extra food to make up for the leakage.

In short, we believe that all the adult tuberculous patient needs is three good meals a day, and that the practice of serving lunches should be abolished.

The main considerations in putting this idea into practice are as follows: It is, of course, necessary that the food be of good quality, be prepared in an appetizing way, and well served; but it is of greatest importance that the food appeal to the taste of the person who is to eat it and, therefore, it is essential that a variety be offered at each meal. A meal may be scientifically correct and be perfectly prepared, but if it does not appeal to the taste of the patient, that meal is little better than

wasted. When the menu permits of a choice, nearly, if not all the patients will eat a sufficient amount.

When you group together patients of both sexes, many nationalities, all ages, and from all conditions of life, this becomes a very important phase of sanatorium administration. Now, if we give our patients only three meals a day, we are up against this problem—no matter how good the meal, a fair percentage of the patients could not or would not eat enough. Under the plan of serving lunches these patients could make up the deficit on milk and eggs at lunch time. If lunches were omitted they were deprived of this opportunity. We solved this quite successfully by the establishment of a cafeteria system. There are many things to be said in favor of this system, but for our purpose here it may be said that it goes a long way towards meeting the problem of individual taste. If there is one thing on the menu which a certain person cannot eat there is a choice of other things which he can make a meal of.

We put this system in operation in March, 1916. When we became convinced that it was successful and that each patient was reasonably certain not only of receiving but of eating three meals a day, we decided to omit the lunches.

The result may be briefly stated as follows:

1. Our patients have gained as much, or more, than under the old system.
2. We have had a very noticeable decrease in digestive disturbances.
3. The patients are satisfied that they are getting enough nourishment and relish their meals better.
4. There is considerable saving in food cost.

Recently we made inquiries to learn how the subject of lunches was dealt with by other institutions. A questionnaire was sent to practically all leading institutions in other parts of the country, and to a few men in private practice.

We have received 31 answers. Sixteen of these say that lunches are necessary, twelve say they are not needed, and three use them in a restricted way. Three of the answers are of special interest and will be quoted here.

Dr. Holden, of the Agnes Memorial Sanatorium at Denver, writes as follows: "I have followed the no-lunch policy at this institution for 13 years. To prove the value of the plan

I placed half of my patients on three meals a day and the other half on two and some times three lunches, in addition to three meals, over a period of three months. At the end of that period we found the three-meal patients showed marked improvement over the five-meal patients, in gain of weight, absence of stomach complications, and in general well being.

"The only exceptions we make are in cases convalescing from some acute illness or those placed on a diet for a short time to correct some digestive disturbance."

Dr. Perry, superintendent Hampshire County Sanatorium, says: "At the two military hospitals where I was stationed I was pleased to find the opinion among some of the leading tuberculosis men was that the lunch business was overdone and the rule was rigidly enforced that no extra diet should be given the men except when under weight and also able to digest the food well."

Dr. Heise, of Trudeau Sanatorium, Saranac Lake, answered as follows: "We are opposed to the idea of extra nourishment altogether except in the case of infirm patients who are losing weight or are far under weight, or whose particular condition may indicate frequent light nourishment. Ordinarily we do not give lunches and think that the results are better so, for the digestive system is not overworked, the appetite at meal time is better, and the needless expense and work are spared. In rare cases we do order extra nourishment between meals. But for some months past we have not had occasion to order it for a single case outside of the infirmary."

To summarize: We feel that lunches should not be served to the tuberculous adult patient except as a special prescription for an unusual condition. In our experience, serving only the three meals per day has given better results, both from the standpoint of the patient and the institution.

DISCUSSION.

DR. WM. R. P. EMERSON, Boston: I have been much interested in the papers that have just been read because I believe the problem of tuberculosis is the problem of nutrition, and not enough attention has been paid to this subject, especially in children, where the question of proper nutrition and growth has been almost universally overlooked.

During the past seven months, at the invitation of the Secretary of the Association for the Relief and Control of Tuberculosis, I have been conducting nutrition clinics and classes at Dill-away Street with malnourished children brought in by the tuberculosis nurses from tubercular families. Although these children had been under the observation of excellently trained tuberculosis and school nurses, we found in a group of fifty, conditions and habits as follows:

Tea and coffee habit	72%
Insufficient food taken	28%
Fast eating	36%
Late hours	64%
Homes disorganized by long sickness	26%
Extra work, as music, languages, employment after school, etc.	54%

Forty percent had diseased adenoids or tonsils. Although there has been much delay in securing adenoid and tonsil operations on account of war conditions and although we have not been able to get these children relieved from school pressure except in occasional instances, these malnourished children have not only come up to the expected rate of gain for normal children but have exceeded it while under treatment by 71%.

A child's parents, brothers and sisters may have died of tuberculosis, the child himself may be malnourished, retarded in growth from one to four years, but he cannot be excused from a school exercise to go home for a light lunch, which the school does not provide, nor for a short rest period, opportunity for which the school does not furnish, unless the school principal gives permission. No request from either private or school physician makes any difference. The greatest obstacles in the treatment of this group of children has been school pressure and the schools.

Another group of similar children at 44 Dwight Street, who came from schools where the principals cooperated with us, gained at the rate of 369% above the average rate of gain of well children—exceeding our group at Dill-away Street by nearly 300%.

In regard to diet, we find it does not matter so much what is served a patient as what he actually takes. It is impossible to know how much is taken without some measure. I have brought a small food exhibit showing how simple it is to measure a child's diet by having either the child himself or the parent write down for 48 hours exactly what is taken; then the reckoning in approximately 100 calorie amounts is very simple. Patients should be divided into three groups: those overweight, those of normal weight, and those underweight. The food habits of this latter group especially should be ascertained, particularly as regards rapid eating, washing down food with liquids, omitting breakfast, etc.; also their daily activities should be known in order to guard against

over-fatigue. It is not enough to get these children up to normal weight and health, but in doing so we should teach them proper food and health habits so that they will stay well. Also a feature of this work is that not only have these children made this good gain without extra cost of living for the family, but that they gain in their own homes and under their usual surroundings, and thus when they get well they stay well.

The problem of malnutrition, though fundamentally medical, is largely educational. This nutrition work, so important in the prevention of tuberculosis, in our experiment can best be carried on in nutrition clinics and classes in the schools, where machinery used for school inspection and for class work is already established. The establishment of such clinics and classes, I am glad to say, was recommended last month in Washington at the conference on child welfare called by the Secretary of Labor, and these recommendations are being adapted by the secondary child welfare conferences now being held throughout this country.

Dr. J. B. HAWES, 2d, Boston: Some time ago, a well known Boston orthopedic physician wished to go up to one of our state sanatoria and teach our patients how to stand properly. He said to me, "Dr. Hawes, the problem of tuberculosis is one of posture." If Dr. Joseph H. Pratt were asked, he would say the problem was one of rest. If Dr. Paterson of the Brompton Sanatorium in England were asked, he would say that the problem of tuberculosis was one of graduated exercises. Dr. Emerson says that the problem is one of nutrition. They are all right, but back of it all is the problem of applied common sense.

I have watched the work of Dr. Emerson and his nutrition classes at the Mass. General Hospital with the greatest interest. It is intensive work, just as Dr. Pratt's Emmanuel Church Tuberculosis Class is intensive work, and as conditions now exist cannot be applied wholesale, much as we would like to do so. When I think of the Rutland Sanatorium with its over-worked group of doctors and nurses, I realize how impossible it would be to carry on all that Dr. Emerson here recommends in regard to the weighing of food, etc. In private practice, however, we can and should do much more than we are doing now; but try as he will, the average busy general practitioner will be quite unable to go into all of the details here mentioned.

I believe that not enough emphasis has been given to the attractiveness of food and the way it is served. Personally, I believe that the average patient will gain more and do better on food which is not so nourishing, perhaps, but which is served attractively, than he will on food with high calorie value unattractively served. Again I would like to see that the pernicious "egg-

nog" is ruled out of the average consumptive's diet. This one article of food alone has upset more stomachs than any one thing that I can mention.

We are all, of course, in accord with the speakers in believing that the stuffing process in consumption is no longer of value. Of course, we ought to know how much and what kind of food our patient is eating, but individualization and common sense, in my opinion, are more important than anything else.

COMMUNITY MACHINERY FOR THE DISCOVERY OF TUBERCULOSIS.

By DONALD B. ARMSTRONG, M.D., FRAMINGHAM, MASS.,
*Assistant Secretary, National Tuberculosis Association;
Executive Officer, Framingham Community Health
and Tuberculosis Demonstration.*

From time to time discussions take place in various communities as to the most effective way in which funds may be expended in the fight on tuberculosis. Arguments are sometimes presented in favor, for instance, of the provision of hospital facilities, and in opposition to the expenditure of funds for nurses and clinics or other community activities.

The futility of arguments in favor of the adoption of a wholly one-sided anti-tuberculosis program is evident. It is like the man who had fifty dollars to spend for a suit of clothes. In looking over the stock in his favorite store he discovered just the suit he wanted for seventy dollars. He then had to decide whether he would purchase a coat and vest now and perhaps a pair of trousers later, or modify his plans and aspirations, to the end of securing immediately a complete suit for fifty dollars. It is just as evident in the case of the man in the clothing store as it is with the community desiring to attack tuberculosis, that it is wholly essential to "cover as much of the situation as possible."

In tuberculosis work we need the trousers as well as the coat and vest, and an inadequate hospitalization equipment, with a certain amount of community nursing and clinic service, will be more effective than a 100 per cent. hospital or sanatorium equipment standing alone in the community's defense against the disease. A chain may be only as strong as its weakest link, but a chain of one link is no chain at all.

What, then, constitutes a complete community equipment for tuberculosis detection, control, and

prevention? We cannot here discuss a complete program in detail, but we wish to emphasize certain neglected links in the anti-tuberculosis chain. In brief, it may be stated that recent experience seems to indicate that the chief deficiencies in tuberculosis programs are found on the side of discovery or disease detection. Numerous recent articles and discussions have dealt with the "next step" in the tuberculosis program. On a basis of the Framingham experience, we would say that the "next step" is the *first step*, which has long been overlooked, namely, the discovery of tuberculosis.

Up to the present time, communities that have been provided with hospital facilities, clinics, tuberculosis nurses, and a certain amount of educational work have considered themselves admirably equipped for tuberculosis work. May it not be that too much, not reliance, but responsibility, has been placed upon these community devices, particularly upon the public health nurse? The clinics and the nurse in the community have been expected and have failed to discover tuberculosis. As follow-up and treatment instrumentalities, they are most essential. It would seem, however, that a community which attempts only a nursing and clinic program is aiming at the third step in anti-tuberculosis work and is ignoring at least two essential preliminary measures, namely, social organization and disease detection. Without these preliminaries, equipment for treatment cannot be most effectively employed.

In spite of the excellent standards established and attained in tuberculosis nursing, in spite of the unjustifiable demands for the discovery of tuberculosis which have been placed upon the nurse in the so-called tuberculosis surveys, it is evident everywhere that the nurse cannot and should not be depended upon to unearth tuberculosis. Essentially this is a medical job, and requires medical machinery; and no group of individuals is more ready to acknowledge this fact than the public health nursing leaders in this country.

By way of illustration, in Framingham, at the beginning of the Health Demonstration in the spring of 1917, a health census or sickness canvass was undertaken, which was in part, at least, a tuberculosis survey by nurses. This survey disclosed a certain amount of hitherto unknown tuberculosis. A week or so later, in

the first medical examination drive in Framingham, a large section of the sickness census group was given thorough medical examinations. The medical examinations of the very people previously covered by the nurses in their canvass or survey disclosed approximately *nine times* as much tuberculosis as was found by the nurses.

For some time preceding the health demonstration in Framingham, the community possessed an excellent tuberculosis clinic, presided over by one of the most public-spirited and efficient clinicians in Massachusetts. The community also employed one of the best tuberculosis nurses in the state, carried on an active anti-tuberculosis educational campaign, and had at its command reasonably adequate hospital facilities through the state sanatoria and other agencies. With this program, the ratio of known cases to deaths averaged three or four to one, and would undoubtedly have remained about the same during the last two years, if certain measures for the *discovery* of tuberculosis had not been initiated, or, in other words, if certain very important links in the anti-tuberculosis chain had not been welded. These new links have greatly altered this ratio, as will be pointed out shortly.

The previously recognized devices for meeting the tuberculosis problem in Framingham and elsewhere may be briefly enumerated as follows:

1. Improvement in general community sanitation.
2. Public health and anti-tuberculosis educational work, aimed primarily at the prevention of infection.
3. The tuberculosis clinic, for the treatment of home clinic cases.
4. The tuberculosis nurse, incidentally for the discovery of new cases, but primarily for home treatment supervision.
5. Bed provision for institutional cases.

In general, the chief features which have, in a partial way, at least, been added to this program in Framingham, and which may prove useful elsewhere, are as follows:

1. Educational work, not only against tuberculous *infection*, but primarily for constructive hygiene and against tuberculous *disease*.
2. Community organization work, of a more extensive as well as intensive character than hitherto devised, in particular the development of intimate neighborhood leadership, to serve all

phases of the tuberculosis program, including disease detection, treatment follow-up, educational work, etc.

3. The adoption of a more flexible and functional basis for the classification of tuberculosis cases, encouraging the recognition of modifications in the routine observation of special groups, such as the arrested cases, particularly as regards their social and economic adjustment, etc.

4. The use of all possible routine as well as extraordinary devices for the discovery of tuberculosis.

As it is the object of this paper to deal primarily with this last mentioned factor, no further attention will be given here to the problems of education, neighborhood or community organization, disease classification, etc.

What have been the chief methods employed in the discovery of tuberculosis in Framingham, and what have been the results of these special efforts? To answer the latter question first, a crude indication of the results attained may be given by presenting in a very brief way the outstanding facts with reference to tuberculosis incidence in Framingham during the period of the demonstration. For full details regarding tuberculosis findings the reader is referred to Monograph No. 5 of the Framingham Health Station series.

On January 1, 1917, there were 27 known cases of tuberculosis under care. During the year preceding the Demonstration (1916) the total number of cases under observation or treatment was 40. During the first year of the demonstration this number increased to 185 and the total number of living cases, active and arrested, now under observation or treatment in Framingham or in outside institutions, is nearly 200. The total number that has been under observation during the period of the demonstration, including lost cases, fatalities, etc., is at present approximately 275.

As stated previously, the ratio of known cases to deaths before the demonstration averaged three or four to one. On a basis of the medical examination findings, this ratio in Framingham has been increased to 9 or 10 to 1 for active cases, and approximately 21 to 1 for active and arrested cases. The same methods of discovery if applied throughout the United States with average uniform results would disclose for treat-

ment something over one million cases of active tuberculosis, together with another million of arrested cases for modified observation.

The methods employed to discover tuberculosis in Framingham both previously recognized and newly devised, may be summarily indicated as follows:

A. Previously adopted routine measures.

1. **Private medical practice.**—The private practitioners in Framingham, numbering about 25, have, of course, continued as usual to report tuberculosis cases. The phrase "as usual" is somewhat misleading, for, under the stimulus of the work in Framingham, the amount of tuberculosis discovered and reported by the physicians, partly in cooperation with the health station staff, has been materially increased. During the decade 1907 to 1916 preceding the demonstration, all of the physicians of Framingham reported on an average 13 cases a year. During the first year of the demonstration, this number increased to 59. These are, of course, all active cases and for the most part more or less advanced cases.

2. **Tuberculosis Dispensary.**—The tuberculosis dispensary, developed under the supervision of the Board of Health, with the help of the tuberculosis nurse, has continued to operate, and has brought to light a certain number of cases.

B. Newly Established Routine Measures.

1. **Medical Work in the Schools.**—With minor and temporary financial assistance from the health demonstration, the official school committee of Framingham has provided for the public schools a practically complete medical, nursing, and clinic system. This includes a full-time school physician, a school nurse, a dental hygienist, a part-time dentist, a dental clinic, together with informal arrangements for other clinic work in connection with the hospitals. On the tuberculosis side this has been very helpful, for the school physician, during the first year of his work, has discovered 11 cases of tuberculosis, active and arrested, in addition to 69 suspects.

2. **Factory Medical Work.**—Entirely financed by private industry, about half of the industrial workers in Framingham have been under full-time medical, nursing, and clinic supervision, while an incomplete nursing and clinic equipment has been established for additional groups of employees. It is hoped that the future may

see this work developed to cover most if not all of the industrial population, and, as already operated, the system has been helpful in bringing to light tuberculosis cases.

3. **Other Community Medical and Nursing Work.**—Through the establishment of infant clinics, with infant welfare nursing, pre-school work, a summer camp for children, and other regular medical examination work, an additional substantial portion of the population has been reached on a routine basis with medical facilities.

C. Special Measures.

1. **The Medical Examination Campaigns.**—In addition to the continuous provision of medical examination opportunities for all types of people in the community, the health demonstration has endeavored on several occasions, through medical examination "drives," to carry out "wholesale" examinations on large sections of the population. (See Monograph No. 4 of the Framingham series). Physicians specially experienced in tuberculosis work, from New England State and private institutions, with the help of nurses, examined in the homes about 5,000 Framingham citizens, largely in family groups. In addition, a thousand or more people have been examined through the health station office. These groups, combined with the examination work in the schools, factories, and elsewhere, bring the total number of individuals examined to date in Framingham to approximately 11,000, out of a population of 17,000. These examinations are representative of all age groups, and reflect all sectional, economic, social, and racial factors in the community.

In addition to valuable data regarding the incidence and preventability of minor and serious affections in general, this cross-section examination of a typical American community furnishes an excellent statistical basis for estimating the incidence of tuberculosis. In this work it was found that about one per cent. of those examined were actively tuberculous, and something over two per cent. tuberculous, including both active and arrested cases. The examination work was extremely productive in disclosing tuberculosis cases.

This work was, of course, relatively expensive and was justified mainly on an experimental basis, though it has done a great deal to stimulate the idea of medical examinations as an

annual procedure in the community. It has encouraged people to go to their own physicians for a regular medical inspection, and has made the population sympathetic to the operation of routine medical examination work in schools, factories, and elsewhere. Indeed, while this type of wholesale medical examination work cannot perhaps be advocated as a procedure for all communities, it does serve as a basis for the establishment of routine medical work in the various groups, and it is in its turn made unnecessary by the operation of this routine machinery.

2. **Expert Consultation Service.**—Of all the devices which have been employed in Framingham, whether routine or special in character, for the discovery of tuberculosis, the consultation work stands first in importance and significance. It is, in fact, the object of this paper to emphasize in particular the advantages of this service and point out that it is, in one form or another, an absolutely essential phase of tuberculosis work, antedating in time, and perhaps exceeding in importance, any of the ordinarily accepted phases in the orthodox tuberculosis program.

The consultation work in Framingham grew out of the medical examination work. It was at first established on a part-time basis, but now requires practically the full-time of one physician, namely, Dr. P. C. Bartlett, the Chief Medical Examiner and Expert Consultant of the Framingham health station. This work requires expert training in the field of clinical tuberculosis, as well as a generous portion of tact and ability. In Framingham, the services of the expert consultant have been offered to all of the physicians and are now used by practically all the men in active practice. The consultant's service is called for in doubtful or difficult cases of respiratory disease and to some extent in the general field of internal medicine. In addition to the presentation of this service to the physicians, measures have been taken of a popular nature to make known to the people the opportunity which the health station offered in this regard. The consultations may be held in the doctor's office, in the health station, or in the homes of the patients, and are provided largely on a free, though partly on a pay basis.

The advantages of the consultation service may be briefly mentioned as follows:

a. The presence of an expert consultant,

working in coöperation with the local physicians, examining patients for them, and handing over the patients to the care of the local physicians for treatment under their direction, serves in a sense as a measure for post-graduate education, this work offering opportunities akin to ordinary lecture, clinic and demonstration procedure.

b. The work with the physicians tends to improve and standardize routine methods of diagnosis, classification, and treatment.

c. The consultation service in Framingham has been of great importance in increasing the amount of known tuberculosis, both active and arrested, under observation or treatment.

d. By removing, in many instances, the burden of diagnosis from the local physicians, it encourages the discovery of early cases. During the first year of the demonstration, out of the total number of active cases reported, 42 per cent. were advanced, whereas, in the second year of the demonstration only 19 per cent. of those reported were advanced.

e. It directly encourages tuberculosis reporting.

f. It tends to improve methods of home treatment, and also increases the percentage of cases institutionalized, the consultant being a man fully familiar with the procedure and opportunities for hospitalization, and being in a position to advise regarding the best method of treatment.

g. In many ways the consultation service supplements the other medical, nursing and dispensary community machinery, and, with the routine medical work in schools, factories, and elsewhere, provides on a permanent basis, the primary discovering machinery, essential to the efficient working of all other educational, treatment, and follow-up measures in the complete anti-tuberculosis program.

While this service is relatively expensive for a small community, it is believed that it may readily be established for larger population groups, possibly on a state basis, working either from hospitals and sanatoria, or under the auspices of the State Departments of Health or State tuberculosis associations. Such a service, possibly on an itinerant basis, could cover in a regular way, on schedule time, many sections and communities in the state most needing this service. Finally, this experience in

tuberculosis work may have demonstrated an important device for application to other fields of medicine.

The experience in Framingham has indicated that tuberculosis exists to a greater extent in the average community than has hitherto been supposed. This is supported by the large number of active cases brought to light, mainly through medical examination work and the consultation service. The use of these special methods for the discovery of tuberculosis has also demonstrated that most if not all of the tuberculosis in a community may be discovered and brought under one form or another of treatment or supervision if looked for. It seems, further, that the average anti-tuberculosis program fails in not recognizing the opportunities and obligations in the field of tuberculosis discovery.

The special efforts to find tuberculosis have also shown that there exists in a normal community a large number of arrested cases of tuberculosis, cases that have been active in the past, and that must always be considered potentially tuberculous. Educational work aimed at the prevention of infection is of little value for this group, for they are concerned with disease, not infection. On the other hand, is not that also true for the great mass of the population everywhere? Will not, therefore, a complete tuberculosis program that discovers all types and conditions of tuberculosis in the community, point the way to a new basis for prevention, aimed at the control of tuberculosis disease, rather than chiefly at the suppression of infection? This means for the future an educational attempt based on constructive hygiene, and an effort at health creation. It means, if not less attention to the death rate, at least more attention to the health rate, as measured by happiness in childhood, progress in school, productivity in industry, and general community vitality.

Thus our tuberculosis program merges into general health promotion. Thus do tuberculosis interests lead to a health program of the broadest scope. Thus may we be justified in teaching, not health for health's sake, but health for the sake of a broader community life.

DISCUSSION.

DR. J. B. HAWES, 2d, Boston: There is still an amazing amount of fear among the laity in regard to tuberculosis, and the use of that

word itself in regard to dispensaries, surveys, etc., has done a certain amount of harm. In Malden, I note with approval that the tuberculosis dispensary is called a public health dispensary.

One of the very best things Dr. Armstrong has done in Framingham is to make the people realize that he is working for public health, all that goes to make public health; that he is not merely trying to find cases of consumption and to break up families and send patients away to sanatoria.

Another important thing he has accomplished is that he has conducted this experiment without public dissension or external evidence of quarreling. For perhaps the first time in this State, as far as my knowledge goes, a movement of this sort has been carried on with a hearty backing of all the local forces and organizations. This is a rare and welcome occurrence, and speaks very highly for Dr. Armstrong's tact and diplomacy. I believe that one reason for this is that he has emphasized the word "health" and has given less stress to the word "tuberculosis."

Perhaps the most important thing that this movement has accomplished is to demonstrate the need and the field for the free expert consultant. Of course, to a certain extent this has been going on in Boston and elsewhere at the various large dispensaries and clinics. At the Boston Dispensary, the Boston Consumptives' Hospital Out-Patient Department, and at the Massachusetts General Hospital, there are special days when experts are in attendance to give free advice on lung cases. This, however, is done without the presence of the family physician and away from the patient's home. One important point in regard to this form of consultation work that must be considered is to what extent medical charity is being abused. It would be interesting to hear from Dr. Armstrong his opinion as to how many of these patients whom Dr. Bartlett had seen free in consultation should and would gladly have paid a moderate fee.

I believe that the problem of Dr. Wagner, who is about to start on this line of work in Barnstable County, in this particular regard will be a difficult and interesting one.

I hope that it can be arranged before long that the doctors of our four State sanatoria and elsewhere can give consultations of this sort among cities and towns nearby. This is an important field of work which all of us should consider, and consider carefully.

DR. R. W. HASTINGS, Brookline: Three days ago every practitioner in Brookline received a circular letter from the Board of Health stating that each individual practising was free to call upon Dr. Horace K. Boutwell or Dr. Cleaveland Floyd at any time for assistance in diagnosis of tuberculosis.

The Board of Health has assumed the expense. It seems to me that this is a step forward in securing just what Dr. Armstrong has brought out and stated was important,—diagnosis in doubtful or suspected cases.

When an x-ray or other special examinations are, in the opinion of the consultant, essential for the diagnosis, those also will be furnished without expense to the patient.

Dr. E. O. OTIS, Boston: The experiment of the expert consultant is about to be tried in Barnstable County under the auspices of the Massachusetts Anti-Tuberculosis League.

Dr. Wagner, the superintendent and physician of the local tuberculosis hospital in that county, will devote a portion of his time in going about the county; and in conjunction with, and at the request of the physicians, will examine suspected cases of tuberculosis and advise with regard to the prevention and treatment of the disease.

It is the purpose of the League to extend this expert service to other parts of the State; and it is hoped that the physicians will take advantage of this service. Other states have instituted a similar plan of itinerant tuberculosis experts and found it of great value. The coöperation of the physicians in this experiment is earnestly desired.

It may not be known to all that the American Red Cross has allotted to the National Tuberculosis Association two and a half million dollars to be expended in tuberculosis work; and each State receives an amount equal to the sale in that State of Red Cross seals in 1917. Each local tuberculosis association which is a member of the State League receives its due proportion of the money in accordance with its sale of seals in 1917.

As a result of this donation from the Red Cross, the Massachusetts Anti-Tuberculosis League is enabled to increase and extend its activities, and likewise the local associations.

DR. G. DEN. HOUGH, New Bedford: The reader of the paper spoke of community organization as one factor in health work. I would like to call your attention to an organization that has been formed in my city. It seems to me a very good plan of organization for any community that is not too big.

We have approximately 115,000 citizens. The division is made according to districts of approximately 1,000 population. Of course, you know that an exact division into districts of 1,000 is impossible. We made it as near as we could with such data as we had.

There is appointed in each district a committee of women. I do not need to go into the psychological details as to why a committee of women was appointed as better than one of men. Please accept that as a fact. The size of the

committee is more or less varied. It requires on the average one committee member for each ten or twelve families.

It seems essential to us that the little section of the district which each member of the committee had to look out for should be her own immediate neighbors.

The district committee selects its own chairman. That has worked out very well. This organization was completed last summer. The first real occasion for using it came in our big epidemic last fall.

It seemed to a great many people that there must be a lot of persons who needed financial or other assistance. The district committees were requested to investigate and turn in to headquarters the name and address of every person who needed financial or other assistance.

In forty-eight hours the work was done. There has never been a complaint on the part of anybody that anyone was overlooked in that survey. The astonishing thing was the small number of people who needed financial assistance. We had to spend only about \$500, and this was toward the end of the epidemic.

I commend that form of organization for the consideration of all.

THE REHABILITATION OF THE TUBERCULOUS SOLDIER.

BY CHARLES EUGENE PERRY, M.D., NORTHAMPTON, MASS.

WHEN we first think of army disabilities it is surgical conditions that come to mind, but a little further study of the situation brings out the fact that by far the greater proportion of damage done or brought to attention by the war is of a medical rather than a surgical character.

There have been rejected for tuberculosis, by the local draft boards, about 62,000; 23,000 more, who got by the draft boards, were rejected by the camp surgeons; about 5,000 have been discharged directly from the army and almost 2,500 more from the army sanatoria. There are, at this time, approximately 6,000 tuberculous soldiers under treatment in the army sanatoria in this country and perhaps a few hundred more overseas.

Early in the war the medical men of this country were startled by the reports that came from France that 86,000 soldiers had been discharged from their army on account of tuberculosis during the first year of the war. Tuberculosis workers and medical men in general were much alarmed and felt that our

armies must be gone over very thoroughly to eliminate the possibility of our soldiers who had the least sign, symptom, or even history of such disease continuing in the ranks of our army.

During the summer of 1917, Major Edouard Rist, of the French Army, reported at a meeting of military surgeons at Fort Benjamin Harrison, that the gravity of the situation in France was much less than previous reports indicated, as more than 50% of the 86,000 mentioned had already returned to duty as non-tuberculous. He said diagnoses had been made on much too slight evidence and that really temporary infections of the nose, throat and bronchi were responsible.

The United States was extremely fortunate in having a senior officer who knew well the soldier and conditions obtaining in the Army, as well as being one of the foremost authorities on tuberculosis. Col. George E. Bushnell, retired, for years in command of the Army Tuberculosis Hospital at Fort Bayard, N. M., was recalled to service by the Surgeon General's Office and placed in charge of the tuberculosis work. Colonel Bushnell believed that army life generally, where troops were well fed, was beneficial to cases of arrested tuberculosis with lesions of slight extent. He held, therefore, that the problem was to eliminate those with the manifestly active disease.

With this end in view, boards of examiners were formed of men in the medical corps and contract surgeons who were more or less experienced in the art of chest examination. These boards were characterized by Colonel Bushnell as a fair representation of the country's best skill. That these boards might do uniform work, according to the policies of the Surgeon General's Office, pamphlets of instructions were sent out and schools for tuberculosis examiners were established at Fort Benjamin Harrison and Fort Oglethorpe. I will not attempt to describe the methods used by the boards, or to express an opinion on the character of the work done, except to say that I believe the net result was as good as could be expected, allowing for the haste required.

From the first two and a half millions examined, around 22,000, or approximately six-tenths of one per cent., were found to be tuberculous. The percentage varied from $\frac{18}{100}$ per cent. in the aviation corps to nearly $\frac{9}{10}$ of one

per cent. in some camps. I have no figures to support my claim, but from observation the greater amount of tuberculosis evident among troops was from sections of the country where education and health laws were more backward. Up to the early part of 1918 a great majority of the tuberculosis cases discovered were discharged directly from the Army. About this time the new special hospitals for the treatment of tuberculosis began to reach completion. When these new beds became available, it became the policy of the War Department to hold all soldiers said to be tuberculous until fit to return to duty or until it was evident that no more benefit could be derived by further treatment.

General Hospital No. 16, at New Haven, was the first to open and was used as a school for officers and nurses doing tuberculosis work. It was my good fortune to be assigned to Hospital No. 8, at Otisville, N. Y., at its opening, and it is the work at this with which I am most familiar. When we first entered this new work we were all delighted with the prospect of at last treating tuberculosis under conditions which we thought to offer the best chances for cure and which were difficult to obtain in public civilian sanatoria. With men in military service, accustomed to discipline, who would be obliged to accept details of strict sanatorium treatment and remain as long as was necessary for their cure, apparently an ideal condition existed.

I soon found that we were mistaken. Men sick in hospitals were not as amenable to discipline as in the camps, and they certainly would not accept treatment consisting of rigid rules and rest, gracefully. Some insisted they were not sick and would not remain in bed; others admitted being sick, but insisted they would soon be worse if compelled to remain in that climate; a few openly refused to obey rules regarding the treatment, and when refused furloughs and passes, many were absent without leave. They complained bitterly of the food and some wrote letters home saying that they were receiving no treatment and that the food was very poor and insufficient in quantity. This caused a great deal of unrest at home and many letters were received requesting that soldiers be discharged and containing all sorts of argument to this end. Some sought the assistance of members of Congress

and state and local officials to attain their object. Many patients who, under proper conditions, would have taken treatment faithfully and well, became restive and lost confidence on account of the fault finding and criticism of the few.

These conditions of restiveness have largely been overcome by various means, each method an interesting story in itself. I will attempt to describe only one of the most efficient plans which helped accomplish the end desired.

About two months after the hospital opened there was added the reconstruction department. At first, it consisted of a captain and one second lieutenant and several enlisted men, school teachers and men who had training in army occupational work, but who had had no training in tuberculosis. Captain Mathew McCann, a former high school principal of this State, was in charge and soon made his presence felt as a leader and instructor. He cooperated closely with the medical department through a medical officer who was assigned his advisor and to whom all questions regarding therapeutic work for patients was referred. It was the object of this department to carry out all medical therapeutic exercise prescriptions; to keep the patients contented and as busy as their physical condition permitted and to deliver the men better able physically, mentally, and morally to compete with modern life after their discharge from the Army. These objects were accomplished to a wonderful degree and I believe it is a good object lesson and points a way in which our civil institutions may be greatly improved. The success of such work depends almost entirely upon the ability of the person in charge. He must be one capable and willing to grasp the medical viewpoint and follow medical prescriptions implicitly, and one also capable of making the patients realize that the work is for their own interest and not for the profit of the institution. In fact, he must be nurse, teacher, and morale officer. Few physicians I have seen possess these qualifications.

The work was started by the use of therapeutic walks only. Walks were laid out in a series of five, varying in length from two-thirds of a mile to three miles, and numbered. Men thought able, after a period of hospital rest, were assigned by their immediate medical officer to walk one, and were promoted, as their condition warranted, through the series. Men

in good condition would go through the series in two or three weeks; others would be retained on the short walks for an indefinite period. Each detachment was sent in charge of a non-commissioned officer. The speed did not exceed 90 paces per minute and the time varied from forty minutes to two hours. Resting places were assigned and periods varied from ten minutes to one-half hour. These walks were required of all thought able to undertake them and furloughs and passes, as a rule, were not issued unless a patient was able to be on walk. While at first patients were reluctant to undertake these walks faithfully and cheerfully, so much value was soon evident that the spirit was, later, excellent. It was provided that patients be dropped automatically and held on the ward for further consideration by the medical officer if the temperature was reported as high as 99 twice in seven days or 99.2 or higher at any one time. If the pulse was reported as 100 or over, a special report was sent to the medical officer for investigation. It was further provided that patients should be dropped for further investigation who lost three or more pounds in one week, two pounds in two successive weeks, or one pound in three successive weeks.

Some more teaching personnel was provided and a carpenter shop, an auto school, and a 74-acre farm were established. Men were graduated from therapeutic walks into these departments. Class work was instituted for times that did not interfere with physical reconstruction, and also for a few who were able to do light mental work, but not physical. There were classes in wireless operating, typewriting, English, arithmetic, penmanship, algebra, trigonometry, shorthand, salesmanship, law, farm management, poultry, and bee keeping. A weekly newspaper was established and has been of great assistance through its special articles and editorials, in educating patients and working force concerning tuberculosis. A Pathéscope is in use by the department and gives picture-shows nearly every night to bed patients in the wards. Many of the aliens have taken advantage of the class in naturalization.

The patients have been recently classified in three groups: Ambulatory, semi-ambulatory, and bed, and placed in separate wards. For patients in bed there is provided bedside instruction by teachers and reconstruction aides

in academic work, drawing, and various forms of handiwork. The patients work by themselves and are visited daily by the instructors, who supervise the work and offer encouragement, spending about ten minutes with each patient. This feature of the work is of inestimable value and adds much to cheer up the atmosphere, which tends to become so gloomy.

It is reported that 75% of all patients are engaged in some part of the work at Otisville, while at New Haven a report of one month's work shows 90%. An Otisville report shows that "for many months no patient has been obliged to quit any of the outside work on account of increased tuberculous activity," which shows that the work has been carefully graded according to the physical needs of the patient.

A department like this requires a large force. The one at Otisville for 700 patients has one captain, three second lieutenants, six sergeants, five corporals, fifteen privates, and about twenty-five reconstruction aides. This adds materially to the cost of treatment, but I believe practically the same work can be done with a much smaller force.

When the tuberculous soldier is discharged from the Army he is entitled to apply to the Bureau of War Risk Insurance for compensation. (Compensation has nothing to do with government insurance.)

If found compensable, he may fall in one of three classes: 1. Advanced consumptive; 2, disease active, in need of sanatorium care; 3, disease apparently arrested. At present, the amount of compensation is in accordance with the reduced earning capacity. That is, if a soldier needs care or is otherwise unable to earn anything, he is given full compensation; if later he is able to earn as much or more than he earned before entering the Army, his entire compensation is cut off. The National Tuberculosis Association has recommended that tuberculosis be classed as a "specific, permanent injury" and awarded a minimum compensation rating of 25%, so as not to penalize for individual success in overcoming a handicap.

The advanced case presents the same problem to the community as do others in civilian life, that is, they may be cared for at home, if facilities are adequate and children are not present, or they may be sent to either government or local sanatoria, preferably those near the friends and relatives.

Those with active disease, in need of sanatorium care, in which there is a fair hope of reaching a state of arrest, may be recommended by the Board to go to local sanatoria or to the Public Health Service hospitals.

When the disease is arrested, the soldier is entitled to the services of the Federal Board of Vocational Education, whose duty it is to see that work is obtained either on the old job or that he be given an opportunity of working part time until he becomes able to resume the whole-time job; or, if his old occupation is unsuitable, that he receive retraining in some new line of work.

The work of the Board cannot be too highly commended. It is making itself a clearing station for all the troubles of disabled soldiers. It advises and gives aid and counsel regarding his future welfare; helps him to obtain his compensation; even has been known to assist in fighting divorce suits and in straightening out all sorts of domestic entanglements.

At the request of this Board, a committee of eleven members has been appointed by the National Tuberculosis Association to standardize and make recommendations as to policies in regard to tuberculosis. Dr. Pattison, the medical field secretary, to whom I am indebted for a great deal of information, has been detailed to act as special investigator and secretary of the committee.

Dr. Pattison has recently published a comprehensive article on "Placing the Arrested Tuberculous on a Job"* which has been adopted as its policy by the Federal Board of Vocational Education.

Education is still the crying need in this work, and we can all be of assistance to the soldier and to the Government by disseminating a true knowledge of the disease to the soldier, his friends and relatives with whom we are in constant contact, as well as to the public at large.

In spite of our campaigns of education, the amount of misinformation in regard to this disease among the people and also, to a great extent, among physicians, nurses, and social workers is amazing. The worn-out ideas that tuberculosis is highly infectious to adults and that its cure depends largely on removal to the Southwest, taking a large amount of milk and eggs, and exercising to the limit of one's

* April number of the *Journal of Outdoor Life*.

strength, that weakness may not be brought on by lying in bed, that when the disease becomes arrested one must never undertake any indoor occupation, are widespread and deeply rooted.

The important factor is to impress the soldier that it is not necessary to change his residence; that he is not permanently unable to do any work; that he has a duty to perform to the country in striving to resume as near his former place as is possible; that change of occupation is not, as a rule, to be undertaken unless the former occupation is absolutely harmful in itself or its environments, and that, should he be an open case of tuberculosis, he must live apart from children.

THE REHABILITATION OF THE TUBERCULOUS SOLDIER.

By SEYMOUR H. STONE, BOSTON.

THE government has adopted the following slogan which, I assume, applies to the tuberculous soldier: "The physical cripple must not also become a social and economic cripple."

When a draftee or soldier is found to have tuberculosis and is sent home, the State Department of Health of his state is notified. The names of 2,020 such men have been received by the Massachusetts State Department of Health.* This department sends these names to its district health officer, who, in turn, requests the local Board of Health, the local Tuberculosis Department, or the Anti-Tuberculosis Association, to look up the patient and see that he receives the necessary attention. This work is generally done by a nurse. In Boston, the Boston Consumptives' Hospital Department has one person who devotes her whole time to such work.

So far as treatment is concerned, we find that up to last December only twenty-five men discharged from the Army or Navy, or exempted in the draft from military duties, have been sent to the four State sanatoria, and this with no waiting list for the preceding six months, and I understand the situation has not changed much today. But a recent study made by the State Department of Health shows that there are 55 in hospitals, so 30 must be in other hospitals than the state institutions.

This study of 1512 of the men discharged

*The State Department of Health has since increased this number to 2334; 459 of these are in Boston.

from the Army or Navy, or exempted in the draft discloses these additional facts:—

At present in their home locality ..	1060
Left their home locality	96
Left State	60
Dead	72
Unknown	68
Non-tuberculous	156
	— 1512

Of the 1060 in their home locality we find:—

Under medical supervision	356
No medical supervision	573
Unknown	131
	— 1060
In good condition	271
In poor condition	615
Condition not stated	174
	— 1060
Working	410
Not working	246
Not stated	404
	— 1060

These figures seem to indicate that more than half the number studied are in poor condition and more than half are not under medical supervision.

Here undoubtedly is need for improvement on the part of our local health organizations. We must see that these patients are examined more often, and not only this, but undoubtedly most of the patients need educating in regard to the communicability of the disease and in its curability if treatment is taken early enough. In other words, we must keep an educational campaign going all the time. Dr. Perry has strongly emphasized the need of educating the public in regard to tuberculosis.

Patients are still going to the southwest for cure, and doctors are advising them to go. Many become pitifully stranded and the southwestern states have a very serious problem in the thousands of such patients and their families who become public charges. Appeals have been made to the U. S. Government for relief from this situation, and at the present time a special representative of the National Tuberculosis Association is in the southwest, making a study of the problem. Do not let us make the mistake of advising patients without independent means of support to go west to live, in our efforts to rehabilitate the tuberculous soldier. We can take care of them at home and we ought to do so.

Dr. Perry has told you that the government tuberculosis hospitals are teaching occupations. I wish to emphasize this point and particularly the therapeutic value of such work.

One of the greatest difficulties the individual or agency that tries to rehabilitate a sanatorium patient has to overcome is the rest habit that he is rightly taught at the sanatorium. Some patients seem to think they must rest the remainder of their lives and, of course, it is exceedingly difficult for the rehabilitating agency to find a job where a patient can rest all the time and yet earn his living and also support a family. Is it not here that the sanatorium can help the situation by establishing occupational therapy? If patients, before they are discharged, are given some sort of interesting occupation, will they not fit into the busy world easier and better when they are discharged and ready for self-support? It seems to me that this policy should be also to make the patient more contented with his lot in the institution and that we ought to have fewer complaints. I know that sanatoria superintendents and boards of trustees realize this, but some of them are unable to establish work of this kind without more income or larger appropriations. We ought to help them to install such work and thus assist in making the final step in the rehabilitation of the patient easier.

What I have advocated for the tuberculous soldier I think should apply also to the citizen patient. If it is good for one it is just as good for the other. Our attention and sympathy have been drawn to the handicapped soldier because of the great war and his part in it. Why not now turn our attention and sympathy to the problem of the citizen patient, who is with us by the thousands and sorely in need of our most earnest consideration?

DISCUSSION.

DR. E. O. ORIS, Boston: I understand that every man who is discharged from the demobilization camps is given a careful physical examination, and yet I am finding cases of tuberculosis: one, for instance, in the second stage, and one in the third stage, who were informed they were discharged in good condition. I wonder if the other gentlemen have had such an experience.

Secondly, I would like to ask Dr. Perry's opinion as to whether military discipline in government sanatoria is going to be satisfactory, or do the men become restless and wish to get out.

I would like to ask what the experience of the other doctors has been in regard to these points.

DR. PERRY: I think that most of the men were examined many times during their service, and probably sometimes by an expert on tuberculosis. Some of them, of course, got by. I do not think very many; but I think on demobilization that they are not examining very thoroughly, especially if the men sign the paper and say that they are all right and that there are no symptoms of tuberculosis. The adjutant general's office is rushing to get through.

I do not believe that examination is very thorough. I know it was not in case of soldiers that I examined for discharge. There might have been some cases among them. In examining a regiment of soldiers for tuberculosis the work was done in probably from one to two or three minutes at the most for each examination.

In the physical examination we started out by asking each one to exhale; we examined the most probable places, and if we heard a rale or anything peculiar, we held the men up and looked again, and then they were gone over finally to decide whether or not they had tuberculosis.

In some regiments that claimed to have been examined we did not have records. In Camp Johnston the men said, "We were examined at Camp Gordon" or some other camp. Out of a thousand we might find one or two they had skipped, or else a history of the disease having become active since then.

Some had had typhoid vaccine. I do not believe in taking typhoid vaccine and in exercising immediately afterward. It has started up something in some soldiers' chests.

However, it seems to me that the boards got at the largest number of cases of manifest active disease as well as could be expected with hasty examination.

DR. ORIS: If in demobilization a man is found to have active tuberculosis, can he take his choice as to whether he will go to a military sanatorium, or take war insurance and go anywhere; or, is he obliged to go to the army sanatorium?

DR. HUNT: I might cite a case of one soldier who was discharged well. He had applied for compensation and his claim was being investigated. He had been discharged only two months previous to admittance, and being a far-advanced cavity case, I made the remark to his wife that the man probably had had tuberculosis for eight months or more. She wanted me to testify to that effect, but I managed to get out of doing it.

But, so far, the men have been referred back to the army institutions. On the point of whether a patient would be better in our institution than in the Army, our experience has been that the patients have been incorrigible. They listened neither to rhyme nor reason.

DR. PERRY: I will say that no man who has been discharged can go back to the army hospital. They must go to the marine hospital.

At the Hampshire County Sanatorium I had three soldiers who had been discharged. One was an advanced case, who died. The other two were there too short a time to make a diagnosis. I reported them to the War Risk Insurance Bureau. Another stayed five days and then said one morning that he guessed he would see the parade. He did not return. Another fellow came in and thought he would go down and see the parade. He has not got back.

These soldiers must be under military discipline or else they do as they please.

POSTINFLUENZAL TUBERCULOSIS.

By TIMOTHY J. MURPHY, M.D., BOSTON.

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College.*

In the early part of the 16th century, Fracastoro, a noted Italian physician, advised the Council of Trent to change its place of meeting on account of an epidemic then prevailing throughout the European countries. He proclaimed the disease contagious, and among other wonderful tales, spoke of a leather cap which was the bearer of a contagious principle and when worn by 25 Germans in succession, caused the death of each.

Had it been possible in the early summer of 1914 to secure this mystic cap for a certain group of militaristic Germans, my tale undoubtedly would remain untold, and today this meeting of the Massachusetts Medical Society would not be vibrant with the storied horrors of our recent influenza pandemic.

Undoubtedly the immense gathering of troops, living and dying under conditions exacted by the great World War, was the active agent in weaving into the world's life the material of one of the worst, if not the worst, plagues that history has been compelled to record.

Though the running attack of influenza was quite exacting in its toll of death, what indemnities will it demand of the living—those whom it touched in the passing—what fate awaits them?

When the influenza epidemic dropped over the peak, and the first siege was drawing to a close in late October, the question of postinfluen-

enzal tuberculosis assumed shape for serious medical discussion.

Now, what do we mean by postinfluenzal tuberculosis?

Naegelli showed that upon autopsy at least 99% of persons at the age of 30 harbor a focus of tuberculosis.¹

In Switzerland, Reinhardt demonstrated in a series of 360 consecutive autopsies that 96% were tuberculous.²

In New York, 1,320 autopsies in children under five showed 13.5% with more or less generalized tuberculosis.³

Knopf, in his analysis, contends that from 80 to 90% seem to have contracted the disease before the fourteenth year.²

These quotations give abundant proof of the extent of tuberculous infection in the human race. Acting on this evidence, we would define postinfluenzal tuberculosis as a reactivation of an old tuberculous focus, following a more or less severe attack of influenza.

The recent pandemic of influenza did not materially differ from those which swept over Europe and America in 1793, 1833, 1847, and 1889-90.

These, though variously styled as ague, influenza, and grippé, mainly attacked the respiratory system, differed very little from the so-called Spanish influenza, and undoubtedly had the same bacterial analogy. Although the system of keeping mortality statistics in 1833 and 1847 had not approached the state of perfection which I hope exists today, nevertheless, Hoffman has compiled some definite data⁴ regarding the mortality of New York (Manhattan and Bronx), Philadelphia, and Boston from tuberculosis of the lungs.

In 1833 the mortality rate was 434.6 per 100,000. In 1834, immediately following the epidemic, the rate jumped to 452. per 100,000, while the following year, 1835, it dropped to 416.8.

The epidemic of 1847 was evidently a more severe type. We find in that year, a death rate of 360.6 per 100,000, whereas the year before, 1846, it was 342.1. For 1848 it was 352, and 1849, 360.5 per 100,000, and did not strike its normal trend until 1850, when the rate was 321.8 per 100,000.

Hoffman, in his statistics of mortality from tuberculosis of the lungs in American cities, from 1888 to 1893—one year before, and for

three years following the grippe epidemic of 1889-90,—gives the following:

YEAR	RATE PER 100,000 FOR AMERICAN CITIES	RATE PER 100,000 FOR BOSTON
1888.....	266.....	345
1889.....	252.....	328
1890.....	262.....	333.4
1891.....	245.....	296.3
1892.....	238.....	302.6
1893.....	235.....	286

As the figures would indicate, the mortality rate in Boston was much higher than the average of all American cities in the aggregate. From 1888 to 1893, inclusive, it averaged 65.2 per 100,000 more annually. Tuberculosis was not a reportable disease in Boston until 1907, and the higher rate of mortality might be ascribed to two causes: First, climatic conditions in Boston and vicinity were possibly more favorable for tuberculosis; and secondly, physicians of Massachusetts were more keen in diagnosis of tuberculous conditions.

Obviously, from these statistics, we fail to find any material increase in the incidence of tuberculosis following these epidemics. True, there were 18 more deaths per 100,000 following the influenza of 1833 and 1847. The increase was so small it may be considered negligible.

But what about the recent pandemic?

Here we labor under some disadvantages. Too little time has elapsed for a complete and searching study of its effect on the incidence of tuberculosis, yet we are able to pick a few straws to show the direction of the wind.

By grouping the months from October 1 to May 1 for the years 1914-15 to 1918-19, and listing the cases and deaths from tuberculosis over that period in Boston alone, we obtain the following data:

CASES AND DEATHS FROM TUBERCULOSIS IN BOSTON.

YEAR (OCT. 1 TO MAY 1)	CASES REPORTED	DEATHS REPORTED
1914-15.....	1491.....	661
1915-16.....	1416.....	597
1916-17.....	1424.....	643
1917-18.....	1590.....	726
1918-19.....	1423.....	643

These figures, too, offer very little evidence of an increase in the number of cases of tuberculosis following influenza.

Perhaps the many pulmonary conditions resulting from influenza prevent us thus early from arriving at the right diagnosis.

Stengle⁴ says the number of cases of pul-

monary residua with dubious physical signs will make the diagnosis of pulmonary tuberculosis in the absence of discovered bacilli more questionable than before the epidemic made its appearance.

Landis,⁵ on the difficulties to be encountered in diagnosis, says that persistent and slowly resolving patches of influenza pneumonia (especially at the apex) are going to be mistaken for tuberculosis. Secondly, that known cases of tuberculosis after an attack of influenza are going to offer considerable difficulty as to whether the increase in physical signs is due to extension of the tuberculous process, or a slowly resolving influenza pneumonia which is clearing up.

But let us study the question of postinfluenzal tuberculosis from another angle. How did the tuberculous group fare with influenza?

In Framingham, where a reasonably careful analysis was made, Armstrong⁶ states that 16% of the entire population was infected during the first epidemic, whereas only 4% of the tuberculous group was infected. Furthermore, most of these tuberculous cases were of the arrested type, taking part in the activities of every-day life of the normal population. Excluding active cases under treatment at home, Armstrong figures the incidence of influenza in the tuberculous at 2%.

Goldberg,⁷ in a classification of 1,551 hospitalized patients in Chicago with pulmonary tuberculosis, says 85 were infected with influenza. This is an incidence of 5.4%, whereas in Camp Sherman an incidence of 33% was reported by Friedlander, McCord, and Wheeler.

At the Municipal Tuberculosis Sanitarium of Chicago, in 587 active pulmonary tuberculous cases, an incidence of 6% of influenza was noted.

In a survey of the out-patient department of the same institution where approximately 8,500 cases of pulmonary tuberculosis were under supervision, only 51 cases of complicating influenza were found during the epidemic, an incidence of .6%.

Hawes,⁸ in a review of reports from the superintendents of State tuberculosis sanatoria of Massachusetts, states that an acute attack of influenza, usually associated with bronchopneumonia, of a greater or less severity, has had remarkably little effect on the already ex-

isting tuberculous process as far as increasing its spread or its activity is concerned.

In the Homan Sanatorium, El Paso, only three of 75 patients had influenza, while eight of 35 employees were infected.⁹

In May of this year, through the kindness of Dr. Hawes, I sent to the superintendents of the State tuberculosis sanatoria the following questionnaire:

1. How many cases of tuberculosis were admitted to your institution from October 1, 1918, to May 1, 1919?

2. Of the cases admitted, how many gave a history of influenza (1918-19 pandemic)?

3. How many gave a history of influenza and pneumonia?

4. Of group 2 and 3, how many show a negative tubercular history antedating the influenza infection?

From the answers to this questionnaire, the case records of the Boston Consumptives' Hospital, and the 12th Annual Report of the Massachusetts Hospitals for Consumptives, I made the following chart:

	RUTLAND	WESTFIELD	N. READING	MATTAPAN
Admissions	203	110	185	372
Cases with previous influenza	79	35	38	40
Cases with neg. t. b. history before influenza	39	19	11	15
Incidence of influenza in all cases	29.9%	31.8%	20.5%	10.7%
Incidence of influenza in cases previously t. b.	13.0%	14.0%	14.0%	6.7%
Incidence of influenza in cases previously neg.	13.3%	17.2%	5.9%	4%
Incidence in patients (during epidemic) ..	18.3%	17.3%	4.6%	2.5%
Incidence in employees (during epidemic) ..	21.3%	6.7%	10%	10%

This chart reveals many interesting conditions. The cases admitted to Rutland, Westfield, and North Reading are of the early type. In Rutland, the so-called incipient case obviously predominates. At Westfield, children outnumber the adults. Therefore cases of glandular tuberculosis are more numerous. At North Reading the cases admitted are somewhat more advanced than those received at Rutland, while at Mattapan all cases are of the advanced type, excepting those sent to the cottage wards, awaiting transfer to Rutland, Westfield, or North Reading.

The incidence of influenza in the cases sent to these last three sanatoria—Rutland, Westfield, and North Reading—as indicated by the chart, ranged from 20.5% to 31.8%, whereas at Mattapan the incidence was 10.7%.

There seems, therefore, to be no escape from the conclusion that early tuberculosis is more susceptible to influenzal infection than the far-advanced case.

Bacteriological findings show that the pneumococcus, staphylococcus, and micrococcus catarrhalis are the predominating organisms in influenza. The same mixed infection of the respiratory tract accompanies pulmonary tuberculosis. The longer contact with the organisms exists, the greater immunity is conferred. Our experience at Mattapan apparently confirms this opinion. Conversely, there is less immunity when the inflammatory process is comparatively recent. The higher incidence of influenza in tuberculous cases admitted to Rutland, Westfield, and North Reading may be attributed to this factor.

Excluding tuberculosis of the joints, bones, and meninges, Fishberg⁹ says that the bulk of tuberculous morbidity is caused by the glands, especially the cervical and intrathoracic.

In our children's ward at Mattapan, tuberculosis of the tracheo-bronchial and cervical glands are the most prevalent. We find very few active pulmonary cases among the children, and influenza swept through the wards like measles.

Goldberg cites the same condition in 154 glandular tuberculous cases in the Municipal Tuberculosis Sanatorium of Chicago, where the incidence was 46.2%.

No doubt this high incidence of influenza at Westfield, where the children are in the majority, may be due to the prevalence of glandular tuberculosis.

Of the 40 adult cases admitted to the Boston Consumptives' Hospital, with a previous history of influenza, 32 had far-advanced disease and sputum positive.

In the eight with sputum negative, one had been at Rutland six years ago and discharged arrested; one had empyema, one asthma, one chronic interstitial nephritis, one resolving pneumonia at apex, one a cardiac with a bilateral effusion, and two showed chronic non-tubercular pulmonary symptoms with signs at the bases,—no temperature, and negative x-ray findings.

There were 15 cases which gave a negative history of tuberculosis antedating this attack of influenza, yet each showed advanced signs with cavity formation.

This may seem an anomaly, but on going over case records for several years past, we find about 37.5% of our cases deny a tubercular history up to five months before admission.

During the epidemic there was an influenza incidence of 2.5% in the patients, whereas 10% of the employees were infected. None of the employees had tuberculosis, and examination three months afterwards revealed a negative condition.

The low incidence of 2.5% among patients seems to add further proof to the contention that a low grade inflammatory process of the respiratory tract confers a marked degree of immunity against a frank invasion of influenza.

In those sanatoria where the disease is mild or of early type, and where there is a shorter period of contact with the organisms of mixed infection, the incidence runs higher.

Witness the figures—Mattapan has 2.5% incidence; North Reading, 4.6%; Westfield, 17.3%; and Rutland, 18.3%.

Among the employees of three institutions the incidence runs from 7 to 10%, while at Rutland it is 21.3%.

Clinical observations in the Army and Navy during the epidemic, indicate the high rate of morbidity and mortality in a group of individuals considered of a healthy and robust type.

In Camp Sherman alone there was an influenza incidence of 33% among the troops.

From Camp Cody, Deming, N. Y., Lamb and Brannin report an incidence of 29%.

At Camp Pike, Ark., there were 11,725 cases¹⁰ between September 20 and October 14—a percentage of 23.3 reported by Opie, Freeman, Small, and Rivers.¹¹

From this brief study of the effect of influenza on the incidence of tuberculosis, I have drawn the following conclusions:

CONCLUSIONS.

1. That epidemics of influenza are not followed by any measurable increase in the incidence of tuberculosis.

2. That in people with mild or arrested tuberculosis a higher incidence of influenza is evident than in those with the advanced type.

3. That in people with active tuberculosis a certain degree of immunity is produced by the constant presence of a low grade chronic inflammatory process of the respiratory tract, which protects them to some extent against a frank invasion of influenza.

4. That cases of glandular tuberculosis, especially the cervical and tracheo-bronchial type of children, show a very high incidence of influenza, but very few frank cases of pulmonary tuberculosis follow.

5. Individuals in the prime of life, apparently free from physical defects and previous history of illness, are more susceptible to influenza.

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DISCUSSION

DR. F. R. HUNT, Boston: Dr. Murphy's paper presents statistics against theory. Since I have been working in tuberculosis at least, I have always accepted the theory that following influenza a great amount of tuberculosis could be expected. (Looking at the chart.) During the epidemic of 1889, and the two succeeding years, between 30 and 40 per cent. of the population were stricken with influenza. Subsequent mortality reports certainly show no serious tuberculosis problem as connected directly with influenza.

What we can get out of the last epidemic, as Dr. Murphy explained, is that there is a decided comparative immunity in those who have definite active tuberculosis.

The next thing of importance, I think, is in regard to those cases of tuberculosis that did have influenza. When these patients, positive sputum cases with definite lesions, whether an apex, a whole lobe, or a much greater involvement, had influenza they made a very good recovery, or as in the case of the non-tuberculous, they either had influenza and got over it, or there was a subsequent pneumonia with a fair proportion of deaths.

In those that recovered, as far as I have been able to see, no appreciable effect on the old tuberculous process has resulted.

The old theory, I think, that we have been acting on, will have to be discarded: The tendency will be to replace it with a new one,

and we will hear more often of not new cases, but reactivated, old, or healed tuberculosis.

As Dr. Armstrong says, if there are quite as many as one million active cases of tuberculosis in the United States, there are one million more of the old or arrested cases. Where we got 16 per cent. of these people coming down with influenza, we ought to expect a higher incidence of tuberculosis, if we believe that influenza reactivates these old cured lesions, and we do not, according to our previous statistics.

I think that there are two pregnant sources of error, one being in history taking, the other in calling an active clinical tuberculosis influenza. I do not criticize the man who is giving or taking the history. We know that in tuberculosis work the patient's previous history is almost impossible to get, especially when we attempt to go back more than a few months.

In our far advanced cases about 15 out of 40 say they were perfectly well up to the time their tuberculosis was discovered. A great many of these are old cavity cases, and we know that those do not form over night or in a few months, although we bear in mind the fulminating types, knowing that they are comparatively infrequent.

We know that men come through physical examinations very often and are pronounced negative cases. During the recent epidemic every one was busy, some men claiming to make as many as 60 or 80 visits a day. Everyone was pressed for time and, in many cases, a chest examination was not made.

If the physician thought about a possible tuberculosis, a definite tuberculosis diagnosis was a different thing to make. I am quite sure that some of the cases reported as influenza were really cases of active tuberculosis, not a reactivity of a healed process, but an acute exacerbation of an already active process. One illustration to impress the inaccuracy of history taking and hasty influenza diagnosis. One of our patients at Mattapan came to me in April, 1918, and said, "Doctor, I want to go home." He was feeling pretty fit, and weighed 160 pounds, and he wanted to go to work. I examined him and found trouble in his right upper and left apex. He was a positive sputum case. I advised him not to go. He left the institution. About a week later, I heard that he had joined the Navy, and last November I saw him in uniform. He was at that time visiting one of our patients.

I asked him how long he had been in the Navy, and he said since he had left the institution.

"How have you made out?" I asked him.

He said, "Well, I had influenza last September, was sent to a hospital, stayed there ten days, was discharged back to the navy yard, but had a relapse. Am back again in the Navy, but am doing only light work."

While on his visit, I had four students go over his chest. They easily discovered the tuberculosis lesions. I got the hospital report on him. From it, I found that he was admitted with influenza, with some signs of his right base. Ten days later he was discharged with no signs in his chest. His sputum had not been examined. I think this happens more frequently than we like to think.

This is the kind of case we attribute very often to influenza. If we could get a definite record of more of this kind of case, we would talk less of particular positive contributory agents in tuberculosis.

Original Article.

RADIOTHERAPY.*

BY FREDERICK BRYANT, M.D., WORCESTER, MASS.

In presenting this article it is my purpose to discuss the history of the discovery, the peculiar properties, and the therapeutic use of radioactive substances, as are represented by radium and those extreme electric radiations, as are represented by the roentgen ray. I hope to be able to bring to the physician, who has neither the time nor the opportunity minutely to study these agencies, a dependable estimation of their true worth and the class of cases in which they may be employed with reasonable expectation of results and strongly to urge their acceptance, in a coöperative way, by the surgeon that the work of his hand may have more permanency or cure.

The roentgen ray came as the befitting climax of a wonderful line of brilliant electrical discoveries antedating the Christian era, and participated in by fearless, self-sacrificing mastermen of inventive genius. We cannot pass the names of Dodd and Holzknecht unmentioned. They were our great pioneer roentgenologists. Unprotected and heedless of the warnings of danger, they studied the new radiation with relentless energy, and although wounded and bleeding, like true soldiers, they never faltered, but rushed ahead in the siege and conquest for knowledge until they themselves fell, burned by the very light they would perfect to heal others. They healed others, themselves they could not heal.

In 1895 William Conrad Roentgen was re-

* Read before the Thurber Medical Society of Milford, Mass., April 3, 1919.

producing some experiments which had been published by Leonard in 1892, in which he claimed that the cathode rays could be observed outside the vacuum tube; that they possessed the ability to pass through opaque substances and excite fluorescence in crystals of bario-platino-cyanide. He was unconsciously producing x-rays. He and his late instructor, Hertz, should have received the well-merited honor of this most potent discovery of all ages. On that eventful day Roentgen made use of other men's inventions. He was exciting a vacuum tube perfected by Sir William Crooks, in 1878, using an induction coil invented by Michael Faraday in 1831, when, almost by accident, he discovered the all-penetrating rays.

Roentgen must, however, be credited with one step forward in this discovery, for he covered the vacuum tube tightly with thick black cardboard through which no light could pass. All was absolute darkness, but when he excited the covered tube, a piece of cardboard coated with bario-platino-cyanide, on a table near by, lighted brilliantly. He realized he was dealing with something new—a form of radiation which penetrated opaque substances.

No discovery ever produced such a profound effect. The little town of Wurzburg, high among the Bavarian hills, became the center of universal interest and thought. The news flashed over the scientific world and in an incredibly short period of time men of science, everywhere, began to produce, experiment with, and improve upon the wonderful rays.¹ Nor has the interest ever lagged or halted for one improvement has rapidly followed upon another, till, today, we find that it has not only become one of the most dependable and necessary adjuncts to clinical and surgical diagnosis, but is itself a therapeutic agent of increasing value.

But this was not all. The great discovery, visibly affected all previous conceptions of matter and force. It yielded a new knowledge of radiation and radioactivity. It resulted in a subdivision of the atom which had previously been considered the ultimate division of matter. It established the conception that the atom is again subdivided into electrons and finally brought us to the irresistible conclusion that all matter has an electrical basis for ultimate composition. And still again, this great discovery unquestionably paved the way for the next astounding discovery of the 19th century—radium.

While necessity may be the mother of invention, certainly accident is a close relative. In the discovery of the "wonder metal" chance again played its helpful part, and its real discoverer, like the real discoverer of roentgen rays, received little or no credit. In 1898, three years after Roentgen had startled the world with his almost incredible announcement, Mme. Curie caused almost as great scientific commotion by her claim that she had extracted and isolated a new metal which possessed radiant power akin to roentgen rays. She claimed for this new metal two million times more radiant energy than that possessed by any other metal. Mme. Curie's statements would have been discredited had not the knowledge of the roentgen rays prepared the way for the ready acceptance of this twin discovery.

Radioactivity of metals was discovered in 1896 by an eminent French physicist, Henry Becquerel, who believed that there were fluorescent substances in nature which might give off radiations similar to roentgen rays. He was testing with a photographic plate the amount of fluorescence to be obtained from uranium under the influence of the sun. When the day became cloudy the plate was placed in a drawer and the salt thrown in over it. Later this plate was developed and, to Becquerel's surprise, it had been strikingly affected. He had discovered a new property of matter. He believed it was possible to produce a pocket edition of the x-ray tube. But Becquerel was a physicist unacquainted with the close chemical qualities and combinations of metals. He had discovered something but he was unable to procure it.

At this time Mme. Curie, an eminent chemist, was investigating the radioactivity of metals. Assisted by her husband, she devoted two years in an attempt to isolate the source of this mysterious radiation. In a pitchblend from St. Joachimsthal, in Bavaria, she finally separated a minute residue which possessed an astounding radioactivity transcending all other metals by millions. To this new element she gave the befitting name of radium. It possesses the peculiar and striking property of spontaneously emitting radiations which are capable of passing through metals and other opaque bodies.

The great scarcity and difficulty in obtaining radium accounts for its great market value. The world now looks to America for this almost priceless metal. To ultimately produce one gram requires the mining of 500 tons of

crude canotite ore. This is the most abundant radium-containing ore in the world. It is found in the Paradox Valley, in Colorado and Utah. It has recently been claimed that this ore can be found in a continuous line 150 miles long by five miles wide.²

This ore is the rim rock of the canyon. It is therefore necessary to transport it down into the valley on the backs of mules, and again out of the valley by teams, till the railroad is reached. In the milling and chemical process which this ore now receives, another 500 tons of chemicals, water and coal included, are added. It is the most drastic chemical process known to science. The extract is so very minute that the entire process is exceedingly exacting and strenuous. The end product, like Biblical mustard seed, is the tiniest of all objects and one hundred times more precious than a diamond.

Radium possesses radioactivity "par excellence." It is a property of the atom. It is due to disintegration. Each atom is stable until it undergoes a sort of explosion which changes it to a different chemical element. This disintegration is attended with an evolution of energy greater, by far, than any known chemical reaction. Why certain atoms remain stable for thousands of years and others for billions of years is one of nature's profoundest mysteries.

The amount of energy spontaneously given off by radium is simply astonishing and almost beyond belief. How a substance can give out such a tremendous amount of energy when it receives nothing, from any ordinary source, is a mineral mystery and richly entitles radium to the proud distinction of ~~being the~~ wonder metal, for of all metals radium most closely resembles a living thing. These radioactive changes go on continuously with absolute law and precision, utterly uninfluenced by external conditions.

The radio output of radium comprises three distinct varieties of rays which have different velocities and different degrees of penetration. These rays, generally speaking, leave the mother metal with the velocity of light. The alpha ray is the first to come and is very weak in comparison. The next is the beta ray, which compares with the cathode stream of the roentgen ray tube. This ray must be taken into serious consideration and filtered out, for it is burning in its nature. The last, the gamma ray, is the

most penetrating of them all, and is even more so than the roentgen ray, although the quantity is less. As the result of actual demonstration these gamma rays have been found to be able to penetrate a foot of solid iron.

Each radioactive substance has its period of life in striking similarity to the vegetable and animal world. The time required for one-half disintegration is called the half period. For radium this is seventeen hundred years, and one-half the remainder in seventeen hundred years more, and so on, almost countless time. For uranium the half period is five billion years.

While these rare earths are extremely scarce, yet radioactive substances occur in extremely small amounts almost everywhere. They are present in almost all rocks; they are found in soils and springs; and their activity in the ocean is enormous. They also have an atmospheric activity. It is a matter of wide demonstration that radio active waters exert a decidedly stimulating effect on plant life.

Radium salts are continuously giving off heat in sufficient quantity to keep the salt several degrees warmer than the surroundings. In one hour one gram gives off 134 calories. It is claimed that there is sufficient radium in the earth to maintain its present heat. There has been much speculation among physicists, as to the possibility of the heavenly bodies deriving their illuminosity from radioactive elements. It is thought quite possible that radioactivity may help to maintain the sun's heat.

The question suggests itself why this disintegration transformation has not completed itself to the utter decomposition of radium. But radium is not an end product. It is only one stage of a great mineral evolution. Uranium appears to be the parent radio-element of the whole radium series. Radium is a disintegration product of ionium, while radium in turn disintegrates into another radio-element, and so on in endless change; for, who can tell the age of the hills?

In time it became apparent that the radium rays produced a pronounced effect on living tissues. This was first observed when radium was left too long in contact or near the body; it would produce severe burns. This, in time, led to the use of radium in the treatment of diseased tissues. It now occupies a prominent and substantial place in the treatment of skin and

uterine diseases, malignant and non-malignant growths.

In the medical world there is a wide difference of opinion regarding the actual worth of radiotherapy. At the time of these great discoveries the public in general, and to a more limited degree medical men themselves, became intoxicated with exaggerated hopes of wondrous cures. The pendulum of public opinion swung far to this side. Ignorance of the nature of the rays and inexperience in their use resulted, as could only be expected, in faulty and unskilled methods, disastrous and excruciating burns, with beneficial results few and far between. Brave investigators, determined to find the true nature of the roentgen ray, unprotected and long exposed, fell victims to its unknown powers. Radium was extremely scarce and expensive and difficult to obtain. Being a metal it has been fully understood only by chemists and physicists, who had little knowledge of its medical use. From a lack of knowledge of the true nature of this mysterious metal of gigantic power, physicians and surgeons have been fearful of its use. As a result of all this study and heroic sacrifice, experimentation and investigation, brilliant results and dire failure, the pendulum of medical opinion is swinging back to a proper estimation of radiation worth.

We believe that we are now approaching the truth in this important matter. We believe we are beginning to understand the action of these subtle rays on tissue and the technic of their use and application to disease. And although the time is short we have been able to observe and to tabulate results and to compare experiences and standardize technic till we have reached the position of understanding where it is possible, with reasonable assurance, to indicate to the physician and surgeon the true value and limitations of the new radiations. In the concluding pages I shall endeavor to point out these uses and enter an earnest plea that medical men make use of these agencies whenever definitely indicated, to the end that in this wise selection we may bring the greatest amount of relief and cure to suffering humanity.

The roentgen rays and radium exert a very similar action on normal and diseased tissue. The cancer cell is a weakling and less resistant than the normal structures. It requires only

one-half the amount of radiant energy utterly to destroy it that it requires to prostrate the healthy cell. The cancer tissue is embryonic in structure and becomes an easy prey to radiation if it is accessible and young, or at that stage when the nucleus of the evil cell is undergoing subdivision or procreation. When properly applied and in sufficient doses these radiations act destructively first on the nucleus, then on the body of the cancer cell. At the same time the rays act directly in definitely stimulating a growth of connective tissue which takes the place of the cancer mass. Some argue that the rays do not act on the cancer cell directly in accomplishing its destruction, but that by stimulating a proliferation of connective tissue they bring pressure on blood supply of the cancerous cells and "choke them off." The marked and almost immediate effects of profound radiation which can be observed seem to be too sudden to be produced by connective tissue proliferation, which is a very slow process. Again, others claim that the best and most reasonable explanation of this destructive action is found in the action of the rays directly on the circulation or blood supply of the growth. This arterial degeneration seems most plausible, especially so in the case of radium.

"I am convinced that in the treatment of cancer no single method is satisfactory. We get the greatest number of people well by combining all the agencies at hand. I refer to electro-coagulation, radium, roentgen rays, and surgery."² Electro-coagulation removes or destroys all the cancer growth from the surface and allows the radiations free and close application to any cancer cells remaining in the deeper tissues and avoids the surgical danger of letting the evil cells loose into the lymphatics and blood vessels. Whenever possible, radium and the roentgen rays should be combined in a routine way. The radium applicator is adapted to the deep cavities of the body, where it acts from point and close contact, or may be actually buried in the growth. On the other hand, the roentgen ray is much more suitable when large surface areas are to be radiated and for the scouting of metastases. In this combination we are able to cross-fire the malignant mass from within and from without and bring the greatest amount of radiation to bear on the culprit tissue.

In this judicious selection and wise combination, surgery occupies an important and indispensable place. The radio-therapist in no way seeks to displace the surgeon but rather to aid and coöperate with him, believing that in this combination rests the only hope for the future in battling this, as yet, most unconquerable foe of our race. The surgeon realizes that, unassisted, he cannot hope to improve upon the present frightful situation. He has perfected his technic and has labored long and well only to realize that the dread monster increases his ravages. He hesitates more and more to incise the malignant mass, for he has learned that unless he can remove all the malignant cells he only converts a local into a general disease and hastens rather than retards the evil end. He desperately needs some agency to control the metastases and render the cancer cells less malignant. Radiation, we believe, offers him the only solution.

This coöperation has been extensively entered into in the large foreign clinics in malignant conditions and is coming into rapidly increasing use in our own great medical centers. The following is, in a general way, the method employed. If the case is operable, in some clinics, radiations are employed just previous to the operation, including the mass and along all the lines of metastasis leading out. In other clinics the diseased area is cauterized, but all agree to radiations following the operation along the wound and along all the avenues of escape of the bandit cells.⁴ The patient is impressed with the importance of returning for examination and re-treatment, if found necessary, for a few cells may be left and remain dormant for many years. The danger, therefore, is in too little rather than too much radiation. If this method is strictly adhered to, and the cases are well in the operable class, from 50 to 75 per cent. can be kept from recurrence.

When the case is inoperable or malignancy has returned, radiation offers the only hope of relief from the agonizing pain, nauseous stench, and bleeding, or permanent cure. In the forlorn group of cases radiation has, admittedly, accomplished its most brilliant results. These pained, foul, bleeding, and abandoned outcasts, avoided and shunned, like the leper, are the most pitiable derelicts of our race. When these cases receive profound radiation, a transformation, akin to miracle, takes place. The pain

ceases, the hemorrhage stops, the ulcerations dry up and heal over, the foul offensive odor disappears, the general health improves and the poor sufferer, who had but a few months of miserable, painful existence left, is granted a new lease of comfortable life, varying from one to five years; and a few inseparable cases (6.7 per cent.) have been reclaimed to operability.⁵

The use of radiation in gastric malignancy is of very questionable value. Here it has been impossible to secure a point contact, although many devices have been elaborated for the purpose. Roentgen rays through the abdominal wall seem unable to reach deep enough into the growth to destroy the malignant tissue. The only hope, in this critical situation, is a roentgen diagnosis, sufficiently early, to enable the surgeon radically to remove the growth.

In malignancy of the bladder and rectum the same difficulty of application prevails, but not so unsurmountable. Several ingenious applicators have been devised to establish point contact by introducing the radium through the urethra and pressing it firmly against the malignant mass, under the guidance of the cystoscope. This form of treatment has resulted in the relief of distressing symptoms, the prolonging of life, and in a small percentage, ultimate recovery.¹⁶

Herbst advocates the treatment of cancer of the prostate by exposing the tumor from above and below and inserting multiple needles containing radium for a time of full dosage. They are then removed and the wound closed.⁸ In this radio-surgical combination the malignant growth is destroyed without shock or damage to the surrounding tissues. This same principle has been applied to malignant growths in other parts of the bladder. In this combination radiation becomes the true and useful helpmate of the surgeon.

Radiation has come into considerable use in the removal of small epitheliomas of the mouth, face, and eyelids. This is due to the fact that it is not only very dependable, but because of the little evidence of the growth which remains in the way of unsightly scars. For other facial disfiguring blemishes such as naevi and port-wine marks, it is the only satisfactory remedy.

In gynecological practice radiation has a limited but decidedly valuable application. In troublesome hemorrhagic complications it acts most beneficially in four classes of cases. Let

them be divided as follows: the woman who, young in her menstrual life, flows much too freely; the woman in mid-menstrual life who does likewise and from long standing suffers from pain, anemia, debilitation, and neurasthenia; the woman at or near the climacteric; and lastly, the woman flowing excessively from a small fibroid.

In all these cases the surgeon dreads to remove the uterus, not only because it deprives the patient of the supreme function of maternity, but the fact that almost all have suffered long and severely, renders the major operation a serious undertaking as to immediate danger, and more remotely as to chronic invalidism.

In the case of the woman young in her menstrual life, small doses of radium can be administered, at long intervals and in such a studied manner as to check but not stop the menstrual function. The same treatment applies to the woman in mid-menstrual life. The attending backache, debility and neurasthenia improve from the saving of blood. When the woman is at or near the end of her menstrual zone the radium treatment can be pushed to the entire termination of the menses, for which she can have no further use." It should be added that cases are on record where amenorrhea has been produced by radium, but subsequently the patient has become pregnant.

In the case of bleeding fibroids, with no complications, radium is safely employed if the fibroid is not too large. "In cases associated with pain, in which the fibroid is complicated with inflammatory or other associated lesions, an abdominal operation is preferable to the use of radium." "In a well-chosen case of fibroid, however, radiation is the treatment of choice, because it is simple, almost free from danger, and is most effective in permanently relieving symptoms and ultimately diminishing the size of the fibroid."

In this limited group of cases radiation solves some of the knottiest problems which confront the surgeon. In all inoperable or border-line conditions there is much to recommend radiative therapy. Radium can be applied in the patient's home. An anesthetic is not always required in placing it in the uterine cavity. The watery discharge which follows the occasional nausea soon disappears. Radiations are not painful, neither do

they necessarily interfere with the patient's occupation. There is no shock or operative mortality. It is safe, no matter what the heart, lung, or kidney condition may be.

The action of radiation on goitre is dependable on the fact that glandular tissue being more highly organized than connective tissue is more easily destroyed by this agency. Very favorable reports are at hand to the effect of radiation upon the general symptomatology, but in the reducing of the disfigurement all goitres do not respond alike. Cystic varieties and those composed of a large amount of fibrous tissue are least influenced. In some of our large clinics a certain number of routine radiation treatments are given.* When it becomes evident that the retrogression is insufficient, surgical removal is resorted to. The advantages of this procedure are as follows: no fatalities as the result of treatment, no matter how serious the conditions; no resulting scar; the occupation is uninterfered with; it is painless; it is the treatment of choice if an operation is contra-indicated; if unsuccessful, an operation can be performed with less danger, as the effect of the radiation is to reduce toxicity and check the growth.

It has been demonstrated that radium, when administered internally, is of value in certain chronic diseases which are little affected by other remedies. It has been administered as a radioactive water or in the form of a salt injected directly into the tissues. It seems to deserve first place for its decided and prolonged reduction of blood pressure.¹¹ It has seen considerable service in chronic arthritis. In severe anemias it serves to increase rapidly the number of red blood corpuscles. It promotes the secretions and quickens metabolism. These facts account for its rapid tonic effect.

No other agency produces so marked an impression on keloid elevations. They literally melt away from radium applications. In this connection radium has been used in war surgery to loosen up tendons and nerves tied down by extensive cicatrices. It has also found a use in stimulating atonic wound granulations and chronic fistula openings.¹²

Among other uses of radiation of minor importance may be mentioned intractable and extensive ulcerations of the cervix, a variety of chronic skin lesions which resist other forms of medication, cataracts,¹³ and tubercular skin

and gland affections. In the group of incurable diseases of the lymphatics, radiation offers the only palliative remedy. The white count diminishes, the size of the spleen is reduced, and the glands frequently disappear. As often as they return the remedy may be effectually repeated.

From this résumé of the uses of radiotherapy it would seem to be a remedy of great usefulness, as its indications, for the most part, are where all other medicaments have failed. Relegated to the last call, is it not a wonder that it has accomplished very much at all? Is it not creditable that it has been able to hold even this rear-guard position all along the uncertain years of experimentation, of belittlement, and of condemnation? And finally, is it not a conquering acknowledgment, a transcendent testimony, a clear verdict of justification, when all the large progressive clinics the world over are making use of it in a limited but definite group of our most distressing and hopeless diseases?

It has been the earnest desire of the writer to remove radiotherapy from the vain-glorious pedestal of a cure-all and rescue it from the undeserving slough of a cure-nothing, and give to its credit that which it has and can reasonably be expected to accomplish. Let it then be very conservatively employed only along the lines indicated after a most thorough examination and accurate diagnosis. If this admonition is heeded and the radiations are applied in keeping with the dictates of skilled experience, dependable results will obtain in a realm of greatest suffering and despair.

The students of radiotherapy are eager to bring its powers into successful perfection, disclaiming all unwarranted abilities or possibilities. They appeal to the medical profession to accept, with open, fair, and unbiased minds, their coöperation as one of many means and agencies in the great common struggle against pain and disease.

That confidence in radiation therapy is increasing is evidenced by the fact that increasing discussions of its merits appear in the medical literature and that all the clinics in the large medical centers are rapidly increasing their supply of radium for the various departments. This confidence is also expressed in the reports of world-wide increasingly better results. Gauss, speaking of malignancy, said,

"At Freiburg we no longer operate; we radiate." An eminent American authority speaks of radium in malignancy of the cervix as deserving of first consideration.¹⁴ "Radium is a force of marvellous power, the limits of which are little known, but which occasionally works seeming miracles. I believe we are at the beginning of great things."¹² "Radium is a Godsend to the surgeon."¹⁵ These are attainments worthy of profound consideration. They give us courage and renewed determination to persist diligently along these lines for the final solution of this great problem, and give suffering humanity relief or cure for some of the most cruel curses of our race.

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Book Review.

A Manual of Diseases of the Nose, Throat, and Ear. By E. B. GLEASON, M.D., LL.D., Professor of Otology. Medico-Chirurgical College Graduate School, University of Pennsylvania. Fourth Edition. Thoroughly Revised. Philadelphia and London: W. B. Saunders Co. 1918.

Previous editions of this book have been reviewed in the JOURNAL. It is a textbook of 600 pages for students and practitioners. The present edition contains a considerable number of changes.

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WESTERN MEDICAL METHODS IN THE ORIENT.

THERE has appeared recently in *The Clinic* an interesting survey of medical literature in Japan, China, and Korea. It is probably not generally realized that there has been established a system of medical periodicals in Japan, which indicates that considerable progress is being made throughout the Orient in western medical practice. In a review of current Japanese medical literature, prepared by the staff of the research department of a Korean institution, many facts are presented. In the Japanese *Journal of Dermatology and Urology*, the poisonous substances in the spiny lobster and crab are discussed. In another Japanese medical journal are reported the results of injecting dried liver, muscular tissue, and egg material into animals, the effects on the internal organs of viper poison, and the effects of the use of collargol in a case of rheumatism arising

from some specific malady. The Japanese *Medical News* presents a number of technical articles on disease, including a discussion of the hookworm disease and a study of the effects of the rue on tuberculosis.

Among a number of local periodicals devoted to medicine and allied subjects, there is the *Kyoto Journal of Medicine and Sanitation*, in which is considered the appearance of the blood in paroxysmal hemoglobinuria. The investigations of Japanese scientists on spirochetes are reported in the *Tokyo Medical News*. In one paper are discussed the extractives used for producing immunity; in another the destructive influence of the ultra-violet ray. Japan's journal of bacteriology, the *Saikingaku Zasshi*, presents in its two hundred and sixty-seventh issue some leucocyte counts of monkeys which were infected with smallpox, typhus, and tsutsugamushi or river fever. The *Journal of Medical Science of Kyoto* contains an article dealing with the excitation of nerve muscle preparations, and also a study of cancer of the stomach and kindred affections induced thereby in the liver.

In Tokyo there has been organized a medical society which publishes proceedings and which has contributed a considerable number of interesting papers. It is evident that Japan, as well as America, has problems in mental disease. From one article we learn that as the provision made by the State is very limited, the majority of persons suffering from mental disorders must be cared for at home. Most of these persons are under the unskilled care of their families, while some of them are treated by Shinto or Buddhist priests. In the general treatment of disease, however, it must be conceded that the picture which is sometimes visualized of Japan as a place where sacred relics and brazen gods are relied upon to effect cures should be replaced by a recognition of the definite progress which the people of the Orient are making at the present time in scientific medical methods.

PREVENTABLE DISEASE AND THE AMERICAN RED CROSS.

UNTIL the present war, the Red Cross has symbolized in the public mind a great national force organized for disaster relief; during the course of the war, the activities of the organi-

zation have expanded into many new fields; and now, the Red Cross is planning to engage in activities which will reach far into future generations. A recent issue of the *Red Cross Bulletin* states that it is preventable disease which the Red Cross will undertake to combat, slowly, steadily, and persistently. The need for this activity is very great; while 48,000 American soldiers have died on the battlefield, 300,000 babies and young children have died in this country, many of whom might have been saved had the proper care been available. Statistics show that 16,000 mothers die every year in childbirth; diphtheria, in spite of antitoxin, caused the death of 15,000 children last year; the nation loses between 150,000 and 200,000 young men and women each year from tuberculosis; the influenza epidemic has a world casualty list of 6,000,000 people.

The fact that this disaster is to a great extent unnecessary is becoming recognized, and medicine is now concerned with the prevention as well as the cure of disease. Disease has become a social, rather than an individual problem. It is remarkable that the city, even in congested districts, has applied scientific health measures so successfully to its conditions that it has now become a safer place in which to live than is the country, which, although possessing far greater natural health advantages, has lagged behind the city in introducing public health measures. In order to promote rural sanitation and health, efforts are being made by the national government and by State boards of health in many states to secure for the country and small towns advantages similar to those by which the city has been benefited. For this purpose, the development of public health nursing activities has been begun; plans are being made for the inauguration of a course which will acquaint nurses with the field of public health, its administration, management, and relation to community welfare, and which will prepare them to become intelligent health promoters in their own communities.

MEDICAL NOTES.

CHANGES IN THE MEDICAL CORPS.—A number of changes have been made in the Medical Corps of the Northeastern Department. Lieutenant Colonel Omar Pinkston has been assigned to duty at Fort Andrews to relieve Major George

Guthrie; Lieutenant Colonel Peter C. Field will take the place of Major Arthur E. Austin as department surgeon; Lieutenant Colonel James B. Heysinger will go to Fort Williams at Portland; Lieutenant-Colonel W. A. Powell has been detailed to Fort Slocum; and Sergeant A. M. Wotton, pharmaceutical chemist, and Hospital Steward E. D. Ball have been discharged from service.

VICTORIA HOSPITAL IN ROME.—The foundation stone of the Victoria Hospital in Rome, which was laid on April 28, bears the following inscription: "Victor Emmanuel III Rex Italiae lapidem auspicalementi nosocomii a victoria excitandi sollemniter ritu statuit iii Kal. Maias Anno MCMXIX." The hospital is situated at Monteverde, and will cover an area of about 200,000 square metres. The capacity will be at first a thousand beds; later, this number will be increased to fifteen hundred.

QUATERCENTENARY OF LEONARDO DA VINCI.—The four hundredth anniversary of the death of Leonardo da Vinci was celebrated at Naples on May 2. In a recent issue of the *British Medical Journal* there has appeared the following interesting account of his work in anatomy:

The great artist was an enthusiastic anatomist. He began his studies in the Hospital of Santa Maria Nova at Florence in 1489, when he was in his 37th year, and continued them at Milan in the Ospedale Maggiore and the Collegio dei Fisici, and afterwards at Rome in 1513 till they were forbidden by Leo X, on a denunciation of body snatching made by some German enemies. He dissected more than thirty bodies of men and women of various ages, and his observations were collected in one hundred and twenty books; much of the manuscript has been lost, and the drawings designed to illustrate the text of a great work on anatomy to have been written in conjunction with Marc' Antonio della Torre, the famous professor of Pavia, lay forgotten in the Ambrosian Library at Milan, and afterwards in the Royal Library at Windsor, until they were discovered in 1902. They are now in course of publication. Some years ago E. Jackschath of Berlin put forward a claim that Leonardo was the real founder of modern anatomy, and that Vesalius stole not only his discoveries but his drawings. While it is undeniable that the great Italian artist was a pioneer in anatomy, the fact remains that his work remained unknown for four centuries.

SCHOOL HYGIENE.—At a recent meeting in Milwaukee of the National Education Association, Section in School Hygiene, Mr. Frank Irving

Cooper discussed the problems involved from a hygienic point of view in schoolhouse construction. He called attention to the necessity of clean, airy, well lighted structures, creating an atmosphere of healthfulness and cheer, and a more uniform and adequate method of ventilating the buildings and making them sanitary. It was reported that in the one hundred and twenty-two of the school buildings tabulated by a committee, sixteen had no provision for special rooms for women teachers, emergency rooms, rooms for physicians; forty buildings had a room for the teachers, but lacked the other requirements; and only eighteen school buildings had a room for the school physician. Mr. Cooper emphasized the need that exists for the consulting school architect, who could supplement the skill of local architects with an expert knowledge of the requirements of school construction.

MORTALITY STATISTICS FOR 1917.—A recent report from the Census Bureau summarizes the mortality statistics from the death-registration area in continental United States for the year 1917. The annual compilation shows 1,068,932 deaths as having occurred in that area in 1917, representing a rate of 14.2 per 1,000 of population. Of these deaths, nearly one-third were due to three causes—heart diseases, pneumonia, and tuberculosis—and nearly another third resulted from the following nine causes: Bright's disease and nephritis, apoplexy, cancer, diarrhea and enteritis, arterial diseases, influenza, diabetes, diphtheria, and bronchitis. The death-registration area of the United States in 1917 comprised 27 states, the District of Columbia, and 43 cities in nonregistration states, with a total estimated population of 75,000,000, or about 73 per cent. of the estimated population of the United States. (The territory of Hawaii has recently been added to the registration area, but the figures given in this summary relate only to continental United States.

The deaths from heart diseases (organic diseases of the heart and endocarditis) numbered 115,337, or 153.2 per 100,000 population. The death rate from this cause shows a noticeable decrease as compared with 1916, when it was 159.4 per 100,000. Pneumonia, (including bronchopneumonia) was responsible for 112,821 deaths, or 149.8 per 100,000. This rate, although much lower than that for 1900 (180.5)

or for several succeeding years, is higher than that for any year during the period 1908-1916. Other deaths were from tuberculosis in its various forms, 110,285, showing an increase in 1917; Bright's disease and acute nephritis, 80,912, or 107.4 per 100,000; apoplexy, 62,431; cancer and other malignant tumors, 61,452; diarrhea and enteritis, 59,504; arterial diseases, 19,055; influenza, 12,974; diabetes, 12,750; diphtheria, 12,453; bronchitis, 12,311; typhoid fever, 10,113; measles, whooping cough, and scarlet fever, together, 21,723. Deaths due to external causes of all kinds—accidental, suicidal, and homicidal—numbered 81,953.

EPIDEMIC INFLUENZA IN FOREIGN CITIES.—A summary of epidemic influenza in foreign countries in a recent Public Health Report shows that as early as June and July, 1918, influenza was epidemic in Great Britain, parts of Europe, India, China, Africa, and Brazil. In the ninety-six great towns of England and Wales, there were three periods of sharply increased general mortality: (1) June 29—July 27; (2) October 5 to December 21; (3) February 8 to March 22,—the highest mortality rates being 21.2, 48.3, and 35.7, respectively. These three waves occurred in each of the 13 large cities. The death rates of Continental Europe and Indian cities throughout 1917 and the first half of 1918 were abnormally high or irregular; increased death rates which may safely be attributed to influenza were noted in July in Bombay, Madras, Calcutta, and Christiana. In August, distinctly increased death rates, presumably indicative of the influenza epidemic, were recorded in Stockholm, Copenhagen, and Amsterdam. In all the cities of this group there was a sharp increase in mortality rates, beginning at various dates from the first half of October to the latter part of October. The third wave of mortality in British cities was shown in the Indian cities, Bombay, Madras, and Calcutta, and in Paris.

HONORARY DEGREES AT YALE UNIVERSITY.—Among the honorary degrees conferred at the commencement exercises at Yale University, two were awarded to physicians, in the following terms:

Samuel Hosea Wadhams: A graduate of Sheffield, in 1894, a surgeon in the regular army, serving in the Spanish War, early sent to

France as an observer, placed later on the General Staff, in tact, in vision, in ability pre-eminent, Colonel Wadhams, more than anyone else, has shaped the policy of his department. During our share in the war, he has borne the entire responsibility for the wounded in the battle area, has won the admiration of his fellow workers, and has earned the honor which his university desires to pay.

Harvey Cushing, Son of Yale, and Harvard professor, a leader in the new field of neurological surgery, in operations of the brain pre-eminent, surgeon in chief of the model Brigham Hospital, honored at home and abroad. Colonel Cushing served with the French in 1915 and 1917, with the British at Messines and Passchendaele, being mentioned in dispatches. At this time organizing intensive study of penetrative skull wounds, he reduced their mortality by one-half. Under our own flag he became chief consultant in neurological surgery for the A.E.F. A gentleman, a bold investigator, an artist in the operative field.

WAR WORK AT ST. ANDREW'S UNIVERSITY.—Because the endowments of the university do not permit unlimited extension along varied lines of study, the war record of the University of St. Andrew's has been an interesting one from the point of view of scientific research. Throughout the period of hostilities a great deal has been accomplished at this school in obviating the difficulties, especially the early ones, which were met by the British Government when supplies which heretofore had been prepared in Germany were produced in the St. Andrew's laboratories under the direction of Prof. Irvine.

Nearly all the students and members of the medical staff who were of an age to do so joined the colors; consequently, there fell to the senior instructors and the group of able women who assisted them, the task of devising methods of meeting the lack of raw materials needed by the Admiralty and the War Office.

New processes for the manufacture of novocain and other synthetic drugs, researches into chemical fillings for shells, the manufacture of materials necessary for cordite, and for providing the government with costly kinds of sugar,—these and many other helpful methods were brought to light. Thus the long established policy of the authorities in training graduates

for research work has perhaps more than ever before proven its great worth.

Although the university stands ready to further its principles of combining training based on fundamental scientific rules with a better knowledge of the necessities and methods of manufacture, the authorities are not at all certain as to financial help which may be expected from the government. Believing that the interests of science will be furthered by so doing, the university has adopted the plan of admitting students who wish to enter at a later age than usual by removing the obstacle which preliminary examination might set in their path, and by instituting systematic courses of instruction in commerce which lead to graduation.

PUBLIC HEALTH COURSES AT YALE UNIVERSITY.—Prof. C. E. A. Winslow of Yale University has recently prepared an outline of the work planned by the Department of Bacteriology and Public Health for those who wish to apply themselves to the important training for Public Health Administration. Progressive study in these classes leads to a Certificate in Public Health, a Doctorate in Public Health, or to the Doctorate in Philosophy.

Students who wish to qualify for the Certificate in Public Health may be of three groups: firstly, those who, just graduating from a college or a technical school, desire to pursue for one year a post-graduate course of training in bacteriology, sanitation, health organization, and vital statistics, with a view toward fitting themselves for positions in health department laboratories, statistical bureaus, bureaus of child hygiene, etc. Secondly, those students who, having already specialized in some field relating to public health, may wish to concentrate their attention on public health campaigns; thirdly, those who wish to specialize in greater detail may take a three-years' course leading to the degree of Doctor of Philosophy. The subjects for study in the last course are carefully outlined with a view to major specialization. Interesting positions in the wide field of public health work may be secured by graduates of any one of the courses referred to above, and the degree of Doctor of Philosophy and the Certificate of Public Health are both open to men or women college graduates with certain necessary prerequisites.

A further course is also contemplated for medical graduates. This will require two years of study in which the work will be practical as well as theoretical and thus will present suitable opportunities for individual endeavor.

BOSTON AND MASSACHUSETTS.

WEEK'S DEATH RATE IN BOSTON.—During the week ending August 9, 1919, the number of deaths reported was 167 against 201 last year, with a rate of 10.94 against 13.36 last year. There were 38 deaths under one year of age against 44 last year.

The number of cases of principal reportable diseases were: Diphtheria, 23; scarlet fever, 12; measles, 8; whooping cough, 12; typhoid fever, 1; tuberculosis, 58.

Included in the above were the following cases of non-residents: Diphtheria, 1; scarlet fever, 3; tuberculosis, 2.

Total deaths from these diseases were: Scarlet fever, 1; whooping cough, 1; tuberculosis, 18.

Included in the above were the following non-residents: Tuberculosis, 1.

RETURN OF BEVERLY HOSPITAL UNIT.—Members of Field Hospital Unit No. 30, made up of residents of Beverly, have recently returned to this country. The unit was organized more than two years ago and served for one year overseas.

REQUESTS TO MEDICAL INSTITUTIONS.—Among the bequests in the will of the late Mrs. Fanny Young of Boston were the following gifts to medical institutions: Convalescent Home of Children's Hospital, \$10,000; Industrial School for Crippled and Deformed Children, \$8,000; Perkins Institute for the Blind, \$8,000; Massachusetts General Hospital, \$5,000; Boston Floating Hospital, \$4,000; District Nursing Association, \$3,000.

BABY HYGIENE ASSOCIATION.—At a recent meeting of the Baby Hygiene Association, it has been announced, Miss Winifred Rand, director, reported that nearly six thousand children are under the supervision of the Association. Dr. William C. Woodward, city health commissioner, discussed the value of hygiene in conserving the health of babies. Dr. Fritz B. Talbot, chief of the children's service of the Massachusetts General Hospital, pointed out the difficulties in securing the milk supply and ad-

vised that the problem be systematically investigated.

The Association has a staff of twenty-eight nurses, five dietitians, and twenty-one conference physicians. Twenty-eight conferences are held each week. Every month there are from ten to fifteen students in the public health course for training in infant welfare.

PROMOTION OF BOSTON PHYSICIANS AND SURGEONS.—The following six Boston physicians have been promoted to the rank of commander in the Medical Corps of the Naval Reserve: Leroi Goddard Crandon, Halsey DeWolf, Robert B. Greenough, George Arnold Matteson, Milton Joseph Rosenau, and Frederick John Patton.

PROMOTION OF DR. POTTER.—Dr. George E. Potter of Wakefield has been promoted to the rank of major. Dr. Potter has been with the Red Cross relief expedition in Poland and along the eastern front since the signing of the armistice, before which he had been in charge of the dental work in one of the base hospitals in Paris. He is a graduate of Tufts Dental School.

GOVERNMENT CONTROL OF HOSPITALS.—A series of government hospitals under the direction of the United States Public Health Service are providing care and treatment for former members of the Army, Navy, Marine Corps, and Shipping Board who have become ill or injured during the war. The Marine Hospital at Chelsea, Robert B. Brigham Hospital and Elks' Hospital at Parker Hill, Roxbury, the West Roxbury annex of the Boston City Hospital, and the East Norfolk Hospital are now under the single control of the Public Health Service. The East Norfolk Hospital has been designated for the care of epileptics.

Cases requiring examination by x-ray, pathological examination, hospital treatment, or observation are sent to the general hospitals at Chelsea or Parker Hill. Major E. K. Sprague is the commanding officer. The Roxbury and West Roxbury hospitals can accommodate nine hundred patients. The Robert B. Brigham Hospital was taken over from the Army on July 1, and now has one hundred and twenty cases under observation and treatment.

Captain Frank A. Davis of the United States Public Health Service is executive officer. Med-

ical and surgical departments have been established and wards opened for neuro-psychiatric, nose and throat, eye and ear, genito-urinary, physico-therapy, x-ray and pathological laboratories. The Elks' Hospital will be opened this summer. The Red Cross maintains a branch bureau at each hospital and provides entertainment, comforts, and home service.

CONSUMPTIVES' HOSPITAL TO TRY RECONSTRUCTION WORK.—To show those patients who are able and also wish to occupy their spare time, how to make useful and ornamental things, is the object of a special committee of the trustees of the Boston Consumptives' Hospital, Dr. James J. Minot, chairman, in coöperation with the Boston Association for the Relief and Control of Tuberculosis, says Seymour H. Stone, secretary of the Association.

The work will begin September 3 at the Boston Consumptives' Hospital, Mattapan, and will be carried on by Miss Dorothy S. Emmons, a trained reconstruction aide, who has been instructing soldiers at the U. S. A. General Hospital No. 16, New Haven, Conn.

This experiment will be started with only a few of those patients who really desire to undertake it in earnest. If articles can be properly finished, an attempt will be made to have them sold and the profit turned over to the patient. Patients will also be enabled to make Christmas presents for their relatives and friends.

In the government hospitals this reconstruction work is conducted on a large scale and much raffia work, wooden toys, and beautiful bead work has been produced. The effect has been to make the patients more satisfied and contented and thus aid in their improvement.

SEMI-CENTENNIAL OF THE MASSACHUSETTS STATE HEALTH DEPARTMENT.—The semi-centennial of the Massachusetts State Health Department will be held at the State House on the afternoon of September 15, under the auspices of the Massachusetts Medical Society, the Associated Boards of Health, and the State Health Department. Addresses will be given by Governor Coolidge, Health Commissioner Eugene R. Kelley, Former Commissioner Colonel Allan J. McLaughlin of Washington, D. C., Sir Arthur Newsholme of London, Professor William H. Welch of Johns Hopkins, and Dr.

Henry T. Walcott of Cambridge, former chairman of the State Board of Health.

BEQUESTS TO HOSPITALS.—The will of the late Arthur Frederic Estabrook includes the following bequests: \$100,000 to the Massachusetts Homeopathic Hospital; \$10,000 each to the Children's Hospital, Boston Floating Hospital, Massachusetts Charitable Eye and Ear Infirmary, Massachusetts Association for Promoting Interests of Adult Blind; \$5,000 each to the Newton Hospital, Cambridge Hospital, New England Hospital for Women and Children, Boston Lying-In Hospital, Thomas Morgan Rotch, Jr., Memorial Hospital, Free Hospital for Women in Brookline, Waltham Baby Hospital, New England Baptist Hospital, Lynn Hospital, Sharon Sanitarium, Boston Dispensary, Home for Aged Women, Boston Home for Incurables, Children's Island Sanitarium, Cullis Consumptive Home, St. Luke's Home for Convalescents; and \$2,000 each to the Boston Nursery for Blind Babies and the Kindergarten for the Blind.

GIFT TO THE LYNN HOSPITAL.—In the will of Maria B. Merrill of Lynn there is included a gift of \$1,000 to the Lynn City Hospital.

ADAMS NERVE ASYLUM.—The Adams Nerve Asylum, Jamaica Plain, receives and cares for persons who, though not insane, are suffering from some disease of the nervous system which can be benefited by treatment at the Asylum. The forty-second annual report shows that there were treated during the year two hundred and thirteen persons, all of whom were women. The Men's House has remained closed, and this, combined with the exercise of strict economy elsewhere, has reduced expenses by about \$2,750 over last year. One hundred and nine patients have recovered or been discharged relieved. Of the service rendered, twenty-two per cent. was without charge, and fifty-seven per cent. was given to those who paid less than actual cost. Eight nurses were graduated during the year.

AMERICAN FUND FOR FRENCH WOUNDED.—At a recent meeting in Boston, Mrs. Benjamin G. Lathrop, president of the Fund for French Wounded, outlined the work which has been done by this organization. There are to be 100 beds to be endowed for the sum of \$6,000, each

in the hospital, which will be erected at Rheims. It will be free to women and children. Forty thousand crates of clothing and supplies have already been sent to be used in the hospital.

The fund was started in the spring of 1915. There have been established forty-eight dispensaries and five million dollars have been spent in emergency relief work. At the Meurthe and Moselle dispensary twenty thousand patients were cared for by the Fund in conjunction with the medical department of the American Red Cross. A motor service, which became the largest woman's organization on the continent, was organized. Americans, as well as French, were cared for, and a reading room was established in Paris. The workers are now gradually withdrawing from their districts, leaving the work organized and ready to be taken over by the French people themselves. Their efforts will be confined to raising funds for the hospital at Rheims.

NEW ENGLAND NOTES.

RHEIMS HOSPITAL FUND.—Contributions to the New England Branch of the American Fund for French Wounded for the American Memorial Hospital have reached a total amount of \$158,686.59.

NEW ENGLAND SANATORIUM AT RUTLAND.—The Central New England Sanatorium at Rutland will care for a number of discharged tuberculous soldiers and sailors under the supervision of the Bureau of War Risk Insurance. The Government has decided to make use of this private institution, although this is an exception to its general policy, because of the excellent educational and occupational facilities afforded there to tuberculous patients. It has been pointed out that the increase of this disease in the National Army following the draft, resulting in the development and discovery of approximately 10,000 cases, indicates the extent to which the public health is menaced by the return of these discharged soldiers to civil life. It has been estimated that of the discharged disabled soldiers and sailors, twenty-two per cent. are tuberculous. The Central New England Sanatorium is only a short distance from the industrial and agricultural colony known as the Rutland Private Sanatorium Association, an institution which affords a social and economic side to life for tuberculous patients rarely found elsewhere.

Obituary.

EDWARD COWLES, M.D.

DR. EDWARD COWLES died recently at the age of eighty-two at his home in Plymouth. Dr. Cowles was born in Ryegate, Vermont, on July 20, 1837, the son of George and Mary (Bradley) Cowles. He received a medical degree from Dartmouth in 1863, and from the College of Physicians and Surgeons, New York, and later received the degree of M.D. from Columbia University, and an LL.D. from Dartmouth in 1890.

Dr. Cowles first became an assistant physician at the Retreat for the Insane, in Hartford, Connecticut, in 1863. From that year until 1872 he was also assistant surgeon in the United States Army, with the rank of captain. In 1872 he became resident physician and superintendent of the Boston City Hospital, where he remained until 1879. He then became medical superintendent of the McLean Hospital, for the treatment of the insane, and held that position until 1903. He directed its removal to Waverley and supervised the erection of what was at that time one of the finest hospitals of its kind in the world. He accepted the professorship of mental diseases at the Dartmouth Medical School in 1885 and continued until 1914. He was also instructor in mental diseases at the Harvard Medical School from 1889 to 1914, and for sixteen years he had been a non-resident lecturer on the same subject at Clark University in Worcester.

Dr. Cowles developed the scientific side of hospital work to a considerable degree, and was the first to conceive and carry out the system of scientific study of the insane within the institution itself, with proper laboratory equipment and a corps of experts. He was also interested in the professional training of nurses for the care of the insane. In his later years he watched with interest the rise and decline of Kraepelin's views, with which his sympathy was limited. He was interested also in psychoanalysis, although not a believer in the extreme views of Freud. He contributed a number of important scientific publications to American psychiatry.

Dr. Cowles was a Fellow of the American Association for the Advancement of Science, a member of the American Psychological Association, American Neurological Association, American Medico-Psychological Association, of which he was at one time president, and he belonged

to the American Academy of Medicine, American Medical Association, Maine Medical Association, the Massachusetts Medical Society, the Boston Society of Psychiatry and Neurology, and the National Geographical Society, as well as foreign medical societies.

On December 25, 1865, Dr. Cowles married Miss Harriet M. Wainwright of Hanover, New Hampshire. He had outlived his wife and is survived only by a brother, Frank Cowles, of Plymouth.

Correspondence.

COMBINED SECRETARY, OFFICE ASSISTANT,
AND HOME HELPER.

Philadelphia, Pa.

Mr. Editor:—

Many professional men of limited means need a secretary who may or may not officiate also as an office assistant. Many qualified girls need a safe and comfortable home and may be willing to lend a hand in domestic economies. A steadily increasing number of professional men's wives need a reliable home helper. Why should there not be made a most suitable combination, upon an equitable basis of mutualities, of these groups of petitioners? The advantages to each will be obvious. They deserve to be discussed upon a constructive and conciliatory basis. Difficulties are by no means insuperable or even serious and can be fully met and adjusted to the abounding comfort of all the parties in interest. We must realize that the time is upon us when pronounced concessions and adjustments must imperatively be made. Radical changes are confronting society. Those are wise citizens who take candid council with his or her best self and begin at once to discard ancient prejudices, to compromise social preferences and customs in the face of inevitable dislocations. First, the wife may object to the unusual, unprecedented, socio-domestic problem. Here we have the proposition of a young woman, a stranger, in the home, who is not a servant nor a "social equal," who yet must be adapted to the "peculiar situation." There we have ground for debate at once. New standards must be made to meet entirely novel and somewhat awkward demands. The sooner that situation is accepted and settled fairly and candidly, the better for all concerned. The candidate for position of secretary or office assistant and likewise contributor to domestic comforts will put in claims for special privileges. All right. Let matters be adjudicated with all the liberality possible. The problem will work itself out if each one is reasonable and also fully appreciates the abundant advantages for all and everyone. Some such arrangements must be made, and that speedily. Beware of those dangerous delays in foresightedness and preparedness which proved so vexing and perilous during the war. We then learned the lessons which would serve for many lifetimes. Let every professional man's wife call a meeting for discussion at once of all those similarly circumstanced in her neighborhood and reduce the propositions to a practical working plan.

Just consider what is gained by such a triple transaction. Each of the parties in interest acquire three most important assets. Only foolish persons would balk at the difficulties.

J. MADISON TAYLOR, A.B., M.D.

POLYPOID GROWTH OF THE PLACENTA.

Massachusetts Homeopathic Hospital,
Boston, Aug. 11, 1919.

Mr. Editor:—

I wish to report the following rather interesting case for publication:

During my internship on the maternity service at the above institution the following case came to my observation.

A patient, multipara II, was first seen in the prenatal clinic at about seven and a half months gestation and, on examination, fetus could be made out in L. O. A. position—fetus heart sounds in left lower quadrant, and on the right side could be felt a globular mass, easily palpable, which felt somewhat like another head, but no fetal parts corresponding with it, or other signs of multiple pregnancy could be ascertained. The patient was getting along very nicely, and she was delivered at term—very simple delivery, no anesthesia necessary—but the fundus remained above the umbilicus, rather high, but yet firm, with no bleeding. After waiting for about fifteen minutes with no very strong contractions taking place, I credded very gently, whereupon uterus contracted firmly and the placenta was delivered with the membranes and several large clots and a moderate gush of blood, after which the fundus contracted down firmly to a position two and a half fingers' length below the umbilicus with no bleeding. As a matter of routine she was given ergot. After washing the clots away from the placenta I noticed a globular mass of tissue, rather fleshy in appearance, firm consistency, and encapsulated, attached to the placenta by a thick fibro-vascular pedicle—diameter, 7 cm.; weight, 125 gms. Upon microscopic examination it was found to be composed of muscle fibres and connective tissue. Diagnosis: Polypoid growth of the placenta. The patient made an uneventful recovery and was discharged on the twelfth day, mother and baby O. K.

LOUIS FELDMAN, M.D.

RECENT DEATHS.

DR. JOHN H. SHERMAN died recently at his home in South Boston at the age of eighty-eight years. Dr. Sherman was born in China, Me., on Oct. 22, 1830. He received his medical degree from Castleton Medical College, Vermont, in 1857, and continued his studies in Augusta, Me. He practised in Nantucket, Middleboro, San Francisco, and Lynn before settling in South Boston in 1873. Dr. Sherman had served as president of the Massachusetts Homeopathic Medical Society, the State Surgical Society, and the Boston Homeopathic Society. He was a member of the American Institute of Homeopathy and an honorary member of the Maine State Homeopathic Society. He is survived by one daughter, Miss Elizabeth C. Sherman.

DR. ELI E. GRAVES died recently at his home in the Penacook district of Concord, New Hampshire. He was born in Jericho, Vermont, on Sept. 9, 1847, and was educated at the University of Vermont and at the Harvard Medical School. Dr. Graves contributed a number of articles to medical literature.

DR. ERNST HEINRICH HAECKEL. Professor Ernst Heinrich Haeckel died at Jena, Germany, on August 9. Professor Haeckel was born in Potsdam on February 16, 1834. At his father's wish he studied medicine and started practising in Berlin, but he became deeply interested in scientific research and later became professor of zoology in the University of Jena, a position which he held for nearly fifty years. Perhaps no one, with the exception of Darwin and Wallace, has done so much as Haeckel to defend the doctrine of evolution.